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Erratum.

Vol. **11.** p. 83. for "ANON. (1940)." read "MILLER, A. M. (1940)."

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See notice on page 3 of cover.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 11.] October, 1941. [No. 10.

DISEASES CAUSED BY BACTERIA AND FUNGI

LERCHE. (1939). Streptokokkenkrankungen bei Tieren und ihre Uebertragbarkeit auf den Menschen. [**Streptococcic Diseases in Animals and their Transmissibility to Human Beings**].—*Dtsch. med. Wschr.* **65.** 404–407. [Translation of abst. in *Bull. Inst. Pasteur.* **37.** 1067. Signed: L. COTONI].

A review of streptococcal infections of animals, with a description of the bacteriological characteristics of streptococci isolated from various species. L. discusses three transmissions of infection from animals to man, citing the reported cases of veterinarians infected with *Str. equi* [see LEIPOLD, W. (1931). *Derm. Wschr.* **93.** 1533]. Epidemics in America, due to the ingestion of milk from mastitis cows, proved to be due to scarlatina streptococci transmitted from human beings to the cows and disseminated in the milk, the animals acting only as intermediaries. *Str. agalactiae* was not incriminated in these epidemics.

DAVIS, J. G., & ROGERS, H. J. (1940). **A Gas-Forming and Proteolytic Variant of** *Str. agalactiae.*—*Vet. Rec.* **52.** 692.

A variant strain of *Streptococcus agalactiae* is described. The strain is identical with the parent organism except that newly isolated cultures in yeast litmus milk medium rapidly produce gas and apparent proteolysis. In subculture the variant immediately reverts to the characters of normal *Str. agalactiae.*

—D. D. OGILVIE.

LITTLE, R. B. (1940). **Streptococci other than** *Streptococcus agalactiae* **found in the Cow's Udder.**—*Cornell Vet.* **30.** 482–494.

This study is complementary to an investigation in four dairy herds, A, B, C, and D (during a nine-year period for A, B, and C and a three-year period for D) into the incidence of mastitis due to *Str. agalactiae* (group I, Minett), in which the routine methods of milk examination have already been reported [*V. B.* **11.** 14]. *Str. dysgalactiae* (group II, Minett) was found in two cows in each of herds B and C. Three of the cases were acute and one mildly chronic in onset, but all became chronic with more or less atrophy of udder tissue and lessening of secretion. In one acute case the symptoms subsided and *Str. dysgalactiae* was entirely replaced by *Str. uberis* at the next examination. The cultural characters of the four strains isolated are compared with those of others from outside sources. Some gave a delayed reaction in salicin and about half failed to ferment sorbitol. One strain reduced methylene blue milk without clotting it.

Str. uberis (group II, Minett) was found as a persisting infection on two or more monthly inspections in three out of the four herds. Usually the disease was benign and had little effect on secretion. In other cases a severe chronic mastitis developed or the onset was acute. All caused mild or severe fibrotic udder changes, even although the organisms suddenly ceased to be shed in many cases. Many other

NOTE :—In certain cases it is not possible to check references in the original publication. Such references are marked with an asterisk.

cases of *Str. uberis* infection were found by only one examination. L. outlines the cultural characters of the *Str. uberis* isolated. Most of the typical strains (aesculin positive, *Str. viridans* type of haemolysis, and pH 4·6–4·9 in dextrose broth) suggest an affinity with the enterococci. One atypical strain failed to produce acid in lactose and milk. The serological typing agreed very largely with that of STABLEFORTH [*V. B.* **3.** 586]. Precipitin reactions were confined to extracts of the homologous strain, but agglutination reactions usually distinguished types A, B, and C. L. discusses fully 16 atypical strains, half of which produced some udder change, and tabulates their chief characters. Certain of them were regarded as *Str. faecalis*. All were mannite and aesculin positive.

Str. acidominimus was found once in each of three herds. It appeared to be almost non-pathogenic. An infected uterus may be a source of this type of udder infection.

—C. V. WATKINS.

STAFSETH, H. J. (1940). **Streptococcic Infections in Dogs. II. Pathogenicity, "Acid Milk", Convulsions, Tonsillitis, Abscesses, Conjunctivitis and Skin Contamination.**—*J. Amer. vet. med. Ass.* **96.** 230–235. [Author's summary copied *verbatim*]. [For part I, see *V. B.* **8.** 5].

Attempts to reproduce any of the syndromes here described by injections of dogs with streptococci in pure or mixed cultures failed.

The rather frequent occurrence of streptococci in abscesses and vital organs suggests that they are responsible, at least in part, for these syndromes. It is suggested that viruses or other pathogenic factors may be the provocative or predisposing causes, a supposition not supported by the experience of Hare and Fry.

Staphylococcus albus and streptococci occur commonly on the skin of dogs. Antiseptics and disinfectants, as ordinarily applied, do not remove or kill these organisms.

Greater care is suggested in injecting materials not readily absorbed, especially when large needles and large doses are used.

The strictest attention to kennel sanitation is suggested as a means of preventing the spread of infection.

LE MAR, J. D., & GUNDERSON, M. F. (1940). **Studies on Streptococcal Fibrinolysis.**—*J. Bact.* **39.** 717–725.

Various β-haemolytic streptococci of human and animal origin (swine, cattle, dogs, sheep, g. pigs, rabbits, foxes, birds) were examined for their lysis activity upon fibrins from human and animal plasma. The group of human streptococci was the most active in attacking all fibrins to some degree, although it dissolved human fibrin the most rapidly and completely. This apparent species specificity did not, however, hold true for other homologous fibrin and streptococcus combinations. Each of the groups of streptococci of animal origin attacked and dissolved human fibrin more quickly and completely than it did its own homologous fibrin. The effect of incubation time upon lysis activity was also studied. With most strains lytic power was increased by prolonging the incubation period of the cultures to 96 hours and decreased by extending the incubation time beyond this.—ALFRED EDEN.

WU, J. P. (1941). **Active Immunization of Mice with Hemolytic Streptococci.**—*J. Immunol.* **40.** 179–187.

Active immunity in mice can be produced by using strains isolated from human beings. The highly virulent strains are most suitable, but W. shows that a definite immunity can also be induced by streptococci of rather low virulence.

Of five strains out of thirteen that failed to immunize, two belonged to the "mucoid" variety, one being of high virulence and one of rather low virulence.—GWILYM O. DAVIES.

SIMMONS, R. T., & KEOGH, E. V. (1940). **Physiological Characters and Serological Types of Haemolytic Streptococci of Groups B, C and G from Human Sources.**—*Aust. J. exp. Biol. med. Sci.* **18.** 151–161.

One hundred strains of group B streptococci were isolated from human beings, 59 being from the throat or excised tonsils. Cross-agglutination tests were carried out with these strains and with a representative group of bovine udder strains. There was no cross-agglutination except with one human strain which was agglutinated by and absorbed a bovine type serum. Thirty-seven lactose-positive human strains satisfied the criteria for *Str. agalactiae* in respect to final pH in glucose broth, reactions in litmus milk, methylene blue milk (1 : 20,000), mannite, salicin, sodium hippurate, aesculin, and growth in depth in 10% bile salt agar. The human strains were more pathogenic for mice than the bovine. Lactose-positive and lactose-

negative strains nearly always belonged to different serological types.

It is considered probable that group B strains found in man are human parasites, independent of any bovine source and that the bovine strains are not, except under unusual circumstances, derived from human sources. If this is correct, human carriers need not be considered as a possible source of infection of cattle with streptococci causing mastitis.

165 group C strains of human origin were tested serologically and biochemically. Classification could be carried out by fermentation of aesculin, amygdalin, and raffinose. This grouping is consistent with, but less complete than, that established by serological methods. Seventy-eight strains of group G haemolytic streptococci from human sources were also examined serologically and biochemically. Strains giving rise to large and minute colonies respectively differ in fermentation of starch, raffinose, and amygdalin. There are several serological types of both "large" and "minute" strains which show overlap.—W. I. B. B.

GREEY, P. H. (1939). **The Detection of Colonies of Pneumococci and Streptococci on Blood Agar by Dried Bile.**—*J. infect. Dis.* **64.** 206–207.

A simple differential test is described for the detection of pneumococcal colonies in a mixture of *Str. viridans* dew-drop colonies on blood agar. Dried bile bacto-oxgall (difco) is placed on several colonies by means of a swab. The bile dissolves in the moisture from the medium to form a solution in which pneumococcal but not streptococcal colonies are soluble. The bile solution also lakes the unaltered but not the altered red blood cells in the medium so that the test can also differentiate α haemolysis, in which secondary haemolysis is at times confusing, from true β haemolysis.—R. O. MUIR.

JUNGHERR, E., & PLASTRIDGE, W. N. (1941). **Avian Staphylococcosis.**—*J. Amer. vet. med. Ass.* **98.** 27–32.

The authors describe an investigation into several outbreaks of staphylococcal infection in poultry, with arthritis as a prominent feature. One extensive outbreak was followed by sporadic vesicular dermatitis. Staphylococci from such cases and from natural cases of fowl pox were found to have more marked pathogenicity than those from other avian sources. An anti-pecking device had been fitted through the nostrils of the birds and this appeared to provide a route of infection. Lesions usually appeared first in the tarso-metatarsal region; swellings of the hock joints etc. are described and illustrated. Blisters of purulent exudate in the bursa over the keel bone were found to be due to "septicaemic" strains of staphylococci. Such strains are compared with those usually regarded as human pathogens, differing chiefly from those in causing peptonization of milk, slow production of acid in lactose and mannitol broth, and in growing on alkaline, bromthymol blue lactose agar without changing the colour of the medium. Among 17 non-pathogenic strains, nine were isolated from the same source as the 12 "septicaemic" strains studied. A division of strains from cases of so-called "navel-ill" in chicks into septicaemic and sporadic groups because of their pathogenic action, did not agree closely with the results of biochemical and biological tests made. The pathogenicity of the "septicaemic" strains was indicated best by α toxin production and by a positive rabbit plasma coagulase test. Less pathogenic strains could be detected by a positive wattle test if applied to young chickens.
—C. V. WATKINS.

ENDREJAT, E. (1940). Der Milzbrand in Iran. **[Anthrax in Iran].**—*Tierärztl. Rdsch.* **46.** 27–29.

Conditions under which sheep are kept in Iran are particularly favourable for the spread of anthrax. The animals graze in the mountains or plains according to the season in flocks of several hundred thousand, being owned by large groups of farmers who pay, to the State or large landowner, a monthly fee based on the number of sheep. The animals visit water holes each day and spread of anthrax when an animal dies of the disease and the carcass is not removed probably accounts for the high incidence. Veterinary supervision was first established in the western provinces in 1936 and, owing to the small personnel, the number of recorded cases represent only a small fraction of the total. Some farmers may lose as many as 50% of their flocks. In 1938–39, 5,697 cases of anthrax in sheep were recorded; the figures for 1937–38 were :– 2,229 sheep, 88 cattle, and 10 horses. The apparent rise in the incidence was due to the increase in the veterinary service, and education of farmers in the detection and notification of the disease.

The methods of control recommended are :–

active immunization over a period of years, control of hides, and extended meat inspection. Hygienic methods can be adopted only after such methods have been tried and the farmers educated as to the nature and spread of the disease.—E. G. WHITE.

ROSE, A. L. (1940). **Pulmonary Anthrax in a Bullock.**—*Aust. vet. J.* **16.** 213–214.

In an outbreak of anthrax, one case attracted attention as it showed symptoms of pneumonia. On P.M. examination the lesions were seen to be confined to the thoracic cavity. In the mediastinum there was a large accumulation of golden gelatinous exudate several inches thick. The lung lesions resembled those of contagious pleuro-pneumonia with " marbling " and infiltration of the interlobular septa. Anthrax bacilli were found in the lesions. The history was that this animal, together with others, had been seen " stampeding " around and " worrying " an anthrax carcass.—W. I. B. BEVERIDGE.

HALL, O. (1939). **Progress of Tuberculosis Eradication in Canada.**—*Canad. J. comp. Med.* **3.** 47–50.

A brief review of the progress of eradication of bovine TB. in Canada under policies of the Dominion Department of Agriculture from 1896–1938. The initial control measures consisted of the free testing of cattle with tuberculin without compensation for reactors. This policy, named the Supervised Herd Plan in 1905, is still in force. As a result of agitation by the milk-consuming public and public health bodies, the Municipal Tuberculosis Order was passed in 1914. This order provided compensation for reactors. In 1919 the Accredited Herd Plan was adopted with the object of eradicating TB. from pure-bred breeding herds. A third plan, the Restricted Area Plan, was promulgated in 1922, the object of which was the continued testing of cattle and elimination of reactors in defined areas until the reactors therein were reduced to 0·5% or less. Compensation for reactors is paid under these two plans. Herds are, however, no longer accepted under the M.T.O. Over three million cattle were receiving attention and approximately 690,000 were awaiting initial tests under the various plans. H. states,

" As a result of our efforts the incidence of infection is decreasing and it is estimated that the percentage of tuberculosis cattle in Canada at the present time does not exceed 3 percent."

Typing the organisms recovered from tuberculous swine in restricted areas incriminated organisms of avian origin in almost 100%.—L. M. HEATH.

I. DUCKWORTH, C. V. (1941). **Progress of Tuberculosis Control in California.**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* pp. 119–121.

II. WIGHT, A. E. (1941). **The General Livestock Tuberculosis Situation.**—*Ibid.* pp. 121–125.

III. —. **Report of Committee on Tuberculosis.**—*Ibid.* pp. 125–130.

I. Following the completion of TB. eradication work among cattle in California, the remaining counties became accredited on 1st November, 1940. California was the last state of the U.S.A. to enter the modified TB.-free area. Progress in eradication was retarded by the non-payment of indemnity until 1931. Since then, however, over 12,000,000 tests have been conducted and 450,000 reactors detected.

II. During the year ending 30th June, 1940, approximately 12,222,000 tuberculin tests were applied to cattle in the U.S.A. Reactors numbered 56,343. This is the lowest degree of infection recorded since testing began in 1917. Expenses incurred during the year totalled about $6,000,000. On 1st November, 1940, about 271,700 herds, containing 3,893,000 cattle were fully accredited. The average value of animals reacting to the test during the year was $91·00, and the average salvage was $37·12. Avian TB. continued to be prevalent in many Central and North Central states. Infection was reported in about 5,000 flocks of 126,600 observed.

During the year approximately 9,530,500 cattle were slaughtered under federal supervision. Exclusive of known reactors to the tuberculin test, 8,384 animals showed evidence of TB. Of these only 2,000 were condemned or passed for cooking under federal supervision. Of 46,674,000 swine slaughtered during the same period 4,077,000 were affected.

During the year, Johne's disease was reported in 14 states. Of 4,428 cattle tested for the disease 383 were classified as reactors.

III. It is anticipated that the approach to complete eradication of TB. in the U.S.A. will result in an increased percentage of " no visible lesion " reactors. A strong recommendation is made, therefore, that additional research should be focussed on the problem of such reactors. Eradication of TB. in poultry

and swine is a necessary adjunct and must be attempted in the near future. In herds of cattle in which infection is proved to exist, quarantine regulations should prohibit all sales except for immediate slaughter. Every attempt should be made by examination of attendants and of all animals on the premises to discover the source of infection. When an animal shows lesions of TB. on slaughter, the herd from which it originated should be retested. Changes in the uniform method of establishment and maintenance of modified accredited herds and areas are advocated. The details are set down at length.—D. D. OGILVIE.

SIMMONS, J. P. (1940). **Field Control and Eradication of Avian Tuberculosis in Poultry and Swine in the Midwest.**—*Proc. 43rd ann. Meet. U.S. Live Stk sanit. Ass., 1939.* pp. 173–176.

Avian TB. has a widespread distribution over the Corn Belt of the U.S.A. In parts the incidence reaches 30–60% of flocks and 2–14% of birds. Eradication of the disease is difficult owing to commercial conditions obtaining in the poultry industry. At present the most potent influence in control is the buying of graded and inspected poultry. Before eradication is attempted further education of flock owners is necessary. In this connexion, the use of talking motion picture films in districts where lectures and demonstrations cannot be arranged, is advocated.—D. D. OGILVIE.

FERREIRA, J. (1938). A tuberculose porcina em Portugal. [**Porcine Tuberculosis in Portugal**].—*Arch. Inst. bact. Cam. Pest.* **7.** 267–362.

From examination of abattoir carcasses F. estimates that 3% of swine in Portugal are affected with TB.

He carried out a large number of cultural and g. pig inoculation tests and isolated 50 strains of tubercle bacilli. Of these 31 were of the human type, 9 the bovine type, and 1 the avian type. He also isolated nine strains which were atypical and which could not be included in any of the three main types.

Laboratory methods are described in detail, but no new knowledge is contributed on this aspect of the subject.—MILLER WATSON.

HUËT, G. J. (1939). Geeft het bovine van den tuberkelbacil bij den mensch een zelfstandig ziektebeeld? [**Is Bovine TB. in Man Distinctive?**]—*Ned. Tijdschr. Geneesk.* **83.** 2744–2749. [English summary]. [Abst. from abst. in *Bull. Hyg., Lond.* **14.** 691–692. Signed: W. F. HARVEY].

H. describes his findings in 19 children infected with the bovine type of tubercle bacillus and emphasizes the extent to which the bacillus causes lesions in human beings in situations other than bones or lymph nodes.

He suggests that if infection of human beings with the bovine type bacillus appears to be more benign than infection with the human type, this is due to the difference in paths of infection, the human type bacillus usually invading the most vulnerable organ, *viz*, the lung.

FELDMAN, W. H., & MOSES, H. (1941). **Human Tuberculosis in a Bovine. Case Report of a Spontaneous Infection in an Adult Bovine.**—*Amer. Rev. Tuberc.* **43.** 418–424.

The histopathology of a caseo-calcareous lesion in a bronchial lymph node and of a calcified lesion in the lung of an adult bovine is described in detail, with an account of the isolation from the material of tubercle bacilli whose colonial characters on glycerinated media and pathogenicity for g. pigs proved them to be of the human type. Although a slight, calcified lesion was also found in a mesenteric lymph node, the source of infection remained undetermined. A brief review is given of previously reported cases of natural infection of cattle with human type tubercle bacilli.—R. O. MUIR.

LESTER, V. (1938). Fejlkilder ved en bakteriologiske tuberkulose-diagnostik. I. Syrefaste saprofyter. [**Sources of Error in Bacteriological Diagnosis of TB. I. Acid-fast Saprophytes**].—*Ugeskr. Laeg.* **100.** 814–817.

From 1932–36, 130 strains of acid- and alcohol-fast saprophytes were isolated from 26,343 samples of material sent to the Serum Laboratory, Copenhagen, for TB. diagnosis. The saprophytes were of two main forms, one having whitish colonies and the other orange colonies.

It is stated that more saprophytes were recovered after Löwenstein's medium was adopted in place of Petroff's medium in 1931 and also that the adoption of the acid-homogenization pre-treatment of samples resulted in more saprophytes being isolated.—J. E.

WATANABE, Y. (1940). **Differentiation of the Human and Bovine Types of Tubercle Bacilli and its Significance.**—*Kitasato Arch. exp. Med.* **17.** 65–73. [In English].

Morphological, cultural, biological, immunological, and chemical methods of differentiating mammalian types of tubercle bacilli are discussed, with critical observations on their reliability, and also the origin of the types of tubercle bacilli. In W.'s view, differential tests which are quite reliable when dealing with extreme types are of doubtful value when applied to strains intermediate between the two. The cat is suggested as a useful animal for differentiation owing to its great susceptibility to bovine type bacilli and its high resistance to the human type.—R. O. MUIR.

STEENKEN, W., Jr., & SMITH, M. M. (1941). **Culture of Tubercle Bacilli. An Improved Technique.**—*Amer. Rev. Tuberc.* **43.** 309–313.

The addition of 5·0 c.c. of malachite green in concentrations of 1 : 1,000 or 1 : 10,000 to the digested sediment of 114 specimens of sputum, 51 of urine, 28 of pleural fluid, and 57 of gastric contents, was shown to reduce the degree of contamination on the authors' modification of Hohn's medium which contained non-bacteriostatic concentrations of lacmoid instead of malachite green and was adjusted to pH 6·2. A higher percentage of cultures of tubercle bacilli was obtained on the modified medium than on Hohn's medium by this technique, and growth appeared consistently earlier. The inoculation of two media, one adjusted to pH 6·2 and another to pH 7·2, was suggested to compensate for a slightly alkaline and a slightly acid inoculum respectively.—R. O. MUIR.

SASANO, K. T., CALDWELL, D. W., NEEDHAM, E. L., & MEDLAR, E. M. (1941). **Demonstration of Tubercle Bacilli. A Comparative Study of Culture and Guinea Pig Inoculation.**—*Amer. Rev. Tuberc.* **43.** 263–273.

The results of culture and g. pig inoculation are compared for the detection of tubercle bacilli in 1,270 specimens of human origin. Details of the digestion and concentration of suspected material are given with a description of the modified Petragnani and Bordet-Gengou media used for culture. The reliability of the culture technique is demonstrated by a summary of the results of culturing the spleens from 100 consecutive tuberculous g. pigs. After listing the advantages and disadvantages of the two methods of diagnosis, the authors recommend a combination of both for a more accurate detection of small numbers of tubercle bacilli.—R. O. MUIR.

BANCE, J. (1940). Étude physico-chimique comparée du métabolisme des bacilles tuberculeux B.C.G., humain, bovin et aviaire, cultivés sur milieu de Sauton. **[Physico-Chemical Study of the Metabolism of Human, Bovine, and Avian Tubercle Bacilli and of BCG on Sauton's Medium].**—*Arch. Inst. Pasteur Tunis.* **29.** 463–465.

Studies were made of human (H), bovine (B), BCG, and avian (Av) types of *Mycobacterium tuberculosis* grown on Sauton's medium. Maximum growth was reached by the end of the sixth week for B and BCG and by the ninth for H and Av when pH values of the medium were BCG, 6; B, 5; H and Av, 4. BCG, H, and B first of all became slightly alkaline (pH 7·5) by the 14th day, after which these cultures became progressively more acid; in contrast the pH of Av decreased directly. Spectral absorption studies showed a close correlation with the pH changes. Phosphate and sulphate ions tended to disappear from the medium as growth proceeded, but then increased in amount again as lysis of dead bacteria occurred. BCG was less active than the other bacilli in relation to its carbon metabolism. B and Av were the greatest users of glycerol which steadily disappeared from all the media as growth proceeded. Av was unique in that hydrolysis of asparagine occurred only in accordance with its ammonia N requirements, there being no increase in ammonia N beyond the neutral level; this is as expected from the pH data.

Generally, all the organisms appeared to evolve in an analagous manner, the only differences lying in the rate of this evolution. Although Av was the slowest in development, it eventually became one of the most prolific utilizers of the various constituents of the medium, glycerol in particular.—A. EDEN.

SAENZ, A. (1939–40). Le problème de la virulence du bacille de Koch. **[The Virulence of the Tubercle Bacillus].**—*Rev. Tuberc., Paris.* **5.** 1030–1065.

S. has found that exactly the same type of

lesion, a massive pulmonary caseation, is caused in rabbits by live virulent bovine type bacilli injected intravenously, as by dead bovine type bacilli enclosed in liquid paraffin and injected intratesticularly. Human type bacilli given in the same way cause only a few non-lethal focal lesions in the lungs, while avian type bacilli have an intermediate action.

S. argues from this finding that the virulence of tubercle bacilli is a property of the bacillary body and depends on its chemical composition and not on the possession of life, linked with power to reproduce and increase in number in the body. If this is not so the effect of the dead bacilli described above is inexplicable.

To study further the problem of virulence of tubercle bacilli derived from their own type host or from a hetero-type host, S. inoculated g. pigs with very small doses (10^{-6}–10^{-8} mg.) of bacilli isolated from human beings, making at the same time colony count cultures. By this method he found that 20 strains of human type bacilli were of normal virulence, seven were hypervirulent, and six attenuated. Two of four bovine type strains (three isolated from human beings) were normal and two were hypervirulent. Seventeen out of 19 strains of human type bacilli from cases of lupus were attenuated.

With regard to the types of bacilli concerned in human TB. in France, S. has only found 22 bovine type strains in 903 cases (2·43%), including two from 24 cases of lupus.

S. has found that the virulence and specificity of the various types of tubercle bacilli remain constant even after sojourn in unusual hosts and in culture. He is suspicious of claims that a bovine strain has become transformed into a human strain or *vice versa*.—J. E.

Saenz, A., & Urquijo, C. A. (1940). Propriétés pathogènes du BCG mort ou vivant enrobé dans l'huile de vaseline. **[Pathogenic Properties of Dead and Living BCG in Liquid Paraffin]**.—*C. R. Soc. Biol. Paris*. **133**. 641–643. [2 refs.]

It has been shown [see preceding abst.] that oily suspensions of dead bovine strains of *Mycobacterium tuberculosis* produce massive lung lesions in rabbits, in contrast to those caused by dead human strains given by the same routes. The present article describes the lesions caused by intratesticular injection of dead BCG, by a technique already described [*V. B.* **9**. 557]. 10 mg. doses of dried BCG in 1 c.c. liquid paraffin were given to seven rabbits; three died in 34, 46, and 51 days respectively and the other four were killed at 20, 33, 80, and 88 days. Except for the one killed last, all showed an extensive hypertrophy of the lungs although this was less than that caused by dead bovine strains of *Mycobact. tuberculosis*. The lesions were more severe, however, than those caused by untreated living BCG. When living BCG in liquid paraffin in doses of 0·1, 1, 10, and 20 mg. was used, the larger doses caused the death of two out of seven rabbits with lesions rather more discrete than those due to dead BCG given under the same conditions (dosage in terms of bacilli, however, was actually only about one-fifth). In rabbits killed between 70–270 days after injection, a tendency to recovery compared with those killed earlier was noted.—C. V. Watkins.

Munro, W. T. (1940). **The Problem of the Virulence of the Tubercle Bacillus.**—*Edinb. med. J.* **47**. 110–116.

M. has isolated the bovine type of *Mycobacterium tuberculosis* from human sputa in 58 cases out of 1,160. An analysis of his data fails to support the theory that bovine type TB. is less virulent for man than the human type, since the death rate was 22 out of 38 in the females and 12 out of 20 in the males.

It is suggested that, in bovine type infection, the duration of a fatal illness is usually short: if, however, the infection is arrested the disease may persist over a long period with attenuation in virulence of the infecting organism. The possibility of a mutation from bovine to human type occasioned by these conditions is discussed.—R. E. Glover.

Smithburn, K. C. (1939). **Resistance to Tuberculosis. I. Factors Associated with the Bacteria. II. Variations Dependent on the Age of the Host and upon Resistance Induced by Vaccination.**—*Amer. Rev. Tuberc.* **39**. 371–382 and 383–396.

I. In testing g. pigs for susceptibility to *Mycobacterium tuberculosis* it was found that the intracerebral route was more sensitive than the subcutaneous or intravenous routes, since the survival time was shortest and the individual variations were least. Thus, 0·01 mg. of a bovine strain, given subcutaneously, killed in 150–199 days with a probable error of mean survival of ± 14·05, while the same dose given intravenously killed in 38–103 days (± 3·96).

When administered by the intracerebral route a dose of 10^{-6} mg. killed in 23–52 days ($\pm$ 1·54); in this case a difference of mean survival of seven days could be regarded as significant. The need for carefully matching groups of animals in respect of weight etc., is stressed.

II. In order to ascertain the effect of age on resistance to TB., groups of young and mature g. pigs were injected intracerebrally with graded doses of virulent organisms. The difference in mean survival was regarded as significant when it was three times or more its own probable error. The resistance to a given dose varied with the age and was inversely proportional to it.

Three vaccines, *viz*, living attenuated tubercle bacilli, heat-killed attenuated organisms, and heat-killed virulent organisms, were used to vaccinate g. pigs by serial subcutaneous doses. The strength of the immunity was checked by the intracerebral inoculation of graded doses of virulent organisms. A significant resistance to all the vaccines was revealed when the test dose was sufficiently small (10^{-4}–10^{-6} mg.); moreover, the results did not indicate a better protection with living attenuated organisms than with the dead vaccine. The relation of hypersensitiveness to enhanced resistance is discussed.—R. E. Glover.

Daddi, G., & Panà, C. (1938). La diffusione ed il destino dei bacilli di Koch in rapporto al loro stato di dispersione. **[The Spread of Tubercle Bacilli in the Body in Relation to Their State of Dispersion].**—*G. Batt. Immun.* **21.** 672–680. [English, French and German summaries]. [Abst. from English summary].

Two groups of g. pigs were intravenously injected with a coarse suspension and a finely dispersed suspension respectively of *Mycobacterium tuberculosis*. The animals were killed at various intervals up to 72 hours after injection and the lungs, liver, and kidneys histologically examined. Cultures of the organism were prepared from the blood bile, and urine.

In the g. pigs which received the finely dispersed suspension, the infection was greatly diffused, the primary lesions were hyperergic and were developing very rapidly into typical tubercular granulomas.

No particular features were noted in the g. pigs receiving the coarse suspension, except that the pulmonary lesions were more numerous in this group.

Griffith, A. S. (1939). **Infections of Wild Animals with Tubercle Bacilli and other Acid-fast Bacilli.**—*Proc. R. Soc. Med.* **32.** 1405–1412.

The article is largely an account of wild animals in which tubercle bacilli and other acid-fast bacilli have been associated with disease. TB. has been found in the following animals living in the wild state :– monkey, antelope, hedgehog, ground squirrel, rat, mouse, sparrow, rook, jackdaw, crow, gull, lapwing, kestrel, partridge, and thrush. It has also been seen in wild animals kept in captivity :– monkey, gnu, deer, antelope, members of the sheep and pig families, tapir, rhinoceros, elephant, bear, tiger, lion, genet, civet, coati, bat, opossum, kangaroo, wallaby, kangaroo rat, mink, rabbit, and parrot.

Pai, H. C., & Hu, C. H. (1940). **The Monocytic Response in the Peripheral Blood of Rabbit to Reinfection of Tubercle Bacilli.**—*Chin. med. J.* Suppl. No. 3. pp. 158–167. [In English].

Rabbits were injected subcutaneously with a suspension of human tubercle bacilli (5 mg. per kg. body weight) and two weeks later they were reinoculated intravenously with a similar dose. Total and differential white blood cell counts were made. In one rabbit a monocytic response was observed four hours after the second inoculation. The monocytes disappeared from the peripheral circulation and the total white cell count dropped from 20,000 to 1,700 per cu.mm. On the second day the count returned to normal. On the third day the monocyte count rose on account of the presence of stimulated monocytes. Another drop in the count occurred at the 72nd hour after inoculation and then the monocytic count again rose until the death of the animal. Other white cells, polymorphs, clasmatocytes, etc., showed similar fluctuations. Similar changes were not observed in the peripheral circulation of other rabbits in the same experiment.

—E. C. Hulse.

Schwartz, R. (1938). Sur la valeur de l'immunisation concentrée avec le BCG pour la production des anti-corps tuberculeux chez le lapin at la prémunition antituberculeuse du cobaye. **[Value of Intensive Immunization with BCG in**

Producing Tuberculosis Antibodies in Rabbits and in Premunising G. Pigs against TB.].—*Rev. Immunol.* **4.** 375–384.

Complement-fixation tests were made with a specific antigen and the sera of 39 rabbits injected either with a single large dose of BCG bacilli or with a series of small doses at one or several places in the skin. Results suggested that antibodies appeared earlier and in greater amounts and persisted longer in rabbits injected by the latter method than in those injected by the former.

A comparison of resistance to subcutaneous injection with 0·001 mg. of a virulent human strain of the tubercle bacillus in 56 g. pigs 3–4 weeks after a single injection of 1·0 mg. of BCG bacilli or after 28 injections of 0·025 mg. at one or several points, showed that the last method was the most and the first the least protective. Repeated conjunctival instillation of small doses of BCG bacilli gave 32 g. pigs a marked resistance to subsequent virulent conjunctival or subcutaneous infection.—R. O. M.

I. Sahai, L. (1940). **Johne's Disease Infection of Laboratory Animals.**—*Vet. J.* **96.** 407–414.

II. Taylor, A. W. (1940). **The Results of the Inoculation of Guinea-Pigs with M. paratuberculosis (Ovine Type) in Liquid Paraffin.**—*Ibid.* 415–417.

I. Using the original technique of Mohler [*V. B.* **10.** 323.], S. attempted to infect laboratory animals with *Mycobacterium johnei*. This was done by intraperitoneal inoculation of a suspension of the organisms in liquid paraffin.

The lesions in the g. pigs used included a fibrous reaction of the omentum which became folded over the spleen and adherent to the abdominal wall. Hard, whitish nodules developed on the surface of the liver, sometimes extending into the substance of the organ. Yellowish-white thickenings on the abdominal surface of the diaphragm were common. The portal lymph nodes were usually involved. In rabbits the lesions were similar. In mice the lesions were almost exclusively on the serous membranes, and in the fowl the distribution was much the same. These results are the same as those obtained by Mohler. S., however, found that these lesions were not specific for *Mycobact. johnei*. They could be produced by similar emulsions of living and dead *Mycobact. phlei*, dead human tubercle bacilli, and dead *Mycobact. johnei*. It was also found that g. pigs did not usually die in a few weeks after injection as claimed by Mohler.

In S.'s opinion the organisms do not multiply after injection; it was not possible to passage the condition.

II. An antiformin-treated portion of the small intestine of a ewe infected with Johne's disease was suspended in liquid paraffin and inoculated into g. pigs. Eight g. pigs out of ten died within 31 days. Granulomatous lesions of the same kind as those described by Sahai [see I] resulted. Lesions in the liver were associated with acid-fast bacilli. The histology of the lesions is described.—D. L. H.

Atkinson, N., & Collins, F. V. (1940). **Swine Erysipelas in South Australia.**—*Aust. vet. J.* **16.** 193–199.

Swine erysipelas was recently reported in New South Wales and Victoria and is now reported from South Australia.

Three forms of the disease are recognized:– (a) a chronic type with typical vegetations on the heart valves and bright red areas on the skin; (b) a septicaemic type with bright red, raised plaques on the skin, frequently rhomboid in shape, and (c) an urticarial type midway between the other two. It is considered that the urticarial form is derived from the septicaemic form, and there was no evidence that the latter was highly fatal. In three of the four urticarial cases, a proportion of the organisms isolated were in the R phase.

Erysipelothrix organisms were isolated from skin lesions and internal organs of a number of cases. These were compared with a culture of *Erysipelothrix* from the National Collection of Type Cultures and they corresponded in morphology, cultural and biochemical characters, and pathogenicity for mice. Antisera were prepared against the overseas strain and three local strains. Agglutinin-absorption tests revealed a group comprising several local strains, with several strains intermediate between this and the overseas strain, which was distinct. This lack of homogeneity among *Erysipelothrix* strains has not been recorded before.

A five-week-old pig was inoculated intravenously with a suspension in saline of the sediment from 25 ml. of a culture in serum broth and a small amount was injected intradermally. The pig became feverish and appeared ill in 24 hours and a definite reaction appeared around the site of the intradermal

inoculation. This was reddish-purple in colour, raised, several centimetres across and rhomboid in shape. On the second and third days, the temperature rose to 107·4° F. and a diffuse reddening appeared on the skin. Six days after injection, the temperature was down and the animal began to recover but the skin was scaly. Eight days after injection the serum was found to have an agglutination titre of 1 : 2,560. A second intradermal injection after three weeks produced no reaction. An addendum to the article reports that this pig died suddenly 58 days after inoculation, although it had appeared normal in the interval. Autopsy revealed minute subepicardial haemorrhages and very extensive vegetative endocarditis of the right atrioventricular valve and right ventricle, central necrosis of the lobules of the liver and acute haemorrhagic inflammation of the first part of the duodenum and last part of the ileum. *Erysipelothrix* in R and S phases was recovered.—W. I. B. Beveridge.

Lütje. (1939). Differentialdiagnostische Beobachtungen über den Rotlauf der Schweine. [**Differential Diagnosis of Swine Erysipelas**].—*Tierärztl. Rdsch.* **45.** 173–179.

This article is concerned with differential P.M. diagnosis in slaughter pigs and pigs killed in emergency, being based on thousands of cases seen at the Veterinary Investigation Office at Stade.

Out of 4,575 pigs killed in emergency, swine erysipelas (S.E.) was diagnosed in 455, swine fever (S.F.) in 245, anthrax in 128, streptococcal infection in 95, salmonella infection in 62, and pasteurella infection in 11, the rest not being specific infections. With regard to differential diagnosis, it is stated that many more than 455 of the above cases were provisionally diagnosed as S.E., including some of the cases of anthrax and salmonella infection. Anthrax in the pig has a variable P.M. appearance and often requires bacteriological differentiation.

Out of 8,525 pigs examined for salmonella infection, this infection was diagnosed in 249, of which 61 were cases of S.F. A mixed salmonella infection plus S.E. was found in 13 S.F.-free pigs. It is known that S.E. and salmonella infection often produce clinical pictures of great similarity, and, as shown above, they may co-exist in the same pig. S.E. is much commoner in pigs over 50 kg. than in weaners. A case of a large outbreak of meat poisoning in 1926 is referred to. The pigs concerned had been diagnosed as affected with S.E., whereas the true diagnosis was *Salmonella enteritidis* infection.

Acute S.F. often resembles S.E. clinically and in P.M. characters, and was the greatest source of difficulty in diagnosis in the course of the work. Diagnostic difficulty may also occasionally arise between S.E. and streptococcal sepsis or acute pasteurella infection. —J. E.

Simons, R. D. G. P. (1939). Een geval van erysipeloid van Baker-Rosenbach en over het mogelijke voorkomen van de varkensvlekziekte in Indië. [**A Case of Baker-Rosenbach Erysipeloid and the Possible Occurrence of Swine Erysipelas in the Dutch East Indies**].—*Geneesk. Tijdschr. Ned-Ind.* **79.** 436–439.

This infection of the hand of a Dutch meat and fish dealer was diagnosed on clinical grounds and was not traced back to swine. Swine erysipelas is unknown in the Dutch East Indies. The organism concerned can exist saprophytically on, or in, animals and fish. —J. E.

Itikawa, O., Wada, I., & Hosoda, T. (1940). Beiträge zur Kenntnis der pathologisch-anatomischen und histologischen Veränderungen des submaxillären Lymphdrüsenrotzes. [**Pathology and Histopathology of Glanders of the Submaxillary Lymph Nodes**].—*Jap. J. vet. Sci.* **2.** 427–446. [In German].

The authors have studied the gross and histological features of the submaxillary lymph nodes of 300 horses affected with glanders and examined P.M. An attempt is made to classify the degree of gross enlargement, but this is difficult because the normal lymph nodes vary in number from 70–150 and form an elongated mass which is not easily measured. Macroscopic lesions of glanders were found in 21 animals of the 103 in which lesions were demonstrated. The incidence of involvement of these lymph nodes was thus 34% of the total number of horses with glanders, but among animals with nasal lesions the incidence was about 50%. In addition to direct infection from the nose the lymph nodes may be infected by the haematogenous route.

The lesions are classified according to their histological structure as exudative, productive,

or mixed. The pathological changes are discussed in considerable detail, such features as caseation, calcification, presence of giant cells, and encapsulation being described and illustrated.—E. G. WHITE.

CALÌ, C. (1939). Il suisepticus negli uccelli. [*Pasteurella suiseptica* **Infection in Birds**]. —*Profilassi.* **12.** 141–143. [French and German summaries]. [Abst. from French summary].

C. found that the goldfinch, the green finch, and the sparrow were susceptible to infection with *Past. suiseptica*, whereas turkeys, geese, ducks, and turtle-doves were not susceptible. Little information is given concerning the scale of the experiments.

GAGO DA CAMARA, N. J. (1936). Estudo comparativo dos métodos de contraste de sôro anti-colera aviária. [**Standardization of Fowl Cholera Serum**].—*Repos. Lab. Pat. vet., Lisboa.* **3.** 124–142. [English and French summaries].

A discussion based on the methods of standardization of fowl cholera serum as practised by the *Staatliches Institut für experimentelle Therapie*, of Frankfurt, and the *Bundesanstalt für Tierseuchenbekämpfung* of Mödling, Vienna.—MILLER WATSON.

SAVINO, E., ALDAO, A., & ANCHEZAR, B. (1939). Los microorganismos del género Pasteurella. I. Los caracteres de cultivo. [**The Genus** *Pasteurella.* **I. Cultural Characters**].—*Rev. Inst. bact., B. Aires.* **9.** 110–121.

A general account of the characters of the organisms of the genus *Pasteurella*, with special reference to their metabolic reactions and to the use of such reactions, combined with microscopic observation, for differentiation of *Past. pseudotuberculosis* and *Past. pestis*.

I. *TUMANSKY, W. M. (1940). **The Use of Rhamnose Culture Medium for the Differential Diagnosis of** *Pasteurella pestis* **and** *Past. pseudotuberculosis.*—*Ber. Mikrobiol. Epidemiol. Parasitol.* **18.** 44–79. [In Russian]. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **138.** 445].

II. *KRASNOWA, A. N. (1940). **The Importance of Rhamnose in the Differentiation of** *Pasteurella pestis* **and** *Past. pseudotuberculosis.*—*Ibid.* 91–101. [In Russian]. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **138.** 444].

I. Strains of *Past. pestis* from south-east Russia, China, and Mongolia acquired the power after several passages on rhamnose medium to attack the sugar, in the same way as *Past. pseudotuberculosis*; strains from India and Italy did not. This new property remained stable over 1½ years. Behaviour towards bacteriophage was not changed. Animal passage had no effect on the acquired property. No strains of either organism fermented lactose, saccharose, raffinose or dulcite.

II. Strains of *Past. pestis* could be divided into rhamnose + and rhamnose − types, the former being usually strains which had been maintained in stock culture for long periods. Some rhamnose − strains gradually became rhamnose +. In view of this finding rhamnose-peptone water can only serve for differentiation between *Past. pestis* and *Past. pseudotuberculosis* when the results are noted within 24 hours.

MILLER, M. J. (1940). **Plague : History and Epidemiology.**—*Canad. J. comp. Med.* **4.** 188–193.

This is a general account of plague, including sylvatic plague. The latter condition has been noted in ten states in the U.S.A., where it is spreading, and it has recently been recorded in Alberta, Canada.—T. W. M. CAMERON.

I. VINCENT, H. (1940). Dysphylaxie hépatique et ictère grave colibacillaire. [**Hepatic Dysphylaxia and Icterus Caused by** *Bacterium coli*].—*C. R. Acad. Sci., Paris.* **210.** 617–619.

II. VINCENT, H. (1940). La dysphylaxie hépatique. Ses conséquences physio-pathologiques et ses rapports avec le déficit alexique du sérum. [**Hepatic Dysphylaxia. Its Physico-Pathological Consequences and its Connexion with Complement Deficiency in the Blood**].—*Ibid.* 725–726.

I. Experimental injection of 5–6 drops of *Bact. coli* culture into the liver tissue or into the hepatic end of the bile duct of the g. pig or rabbit caused rapid death with septicaemia and hepatic dysphylaxia due to disintegration of the liver cells; this was characterized by rupture or necrosis of the cells and their nuclei, the formation of fatty granulations, and desquamation of the bile ducts. Clinical symptoms in rabbits thus affected are described with details of lesions found in the liver P.M. Analogy is

made with the condition of acute yellow atrophy of the liver in man, which V. claims is also of colibacillary origin.

II. In an investigation of the breakdown of immunity in rabbits and g. pigs vaccinated against *Bact. coli* by intrahepatic injection of a small dose of live culture, V. concluded, from a study of the immunological modifications in the blood of these animals just before death, that the complete loss of the immunity set up by vaccination was due to the great reduction in complement caused by the extensive destruction of the liver cells. He suggested that the liver was the probable regulator of the amount of complement in the peripheral blood. —R. O. Muir.

Dimock, W. W., Edwards, P. R., & Bruner, D. W. (1940). **The Occurrence of Paratyphoid Infection in Horses Following Treatment for Intestinal Parasites.** —*Cornell Vet.* **30.** 319–320.

Two cases of paratyphoid infection following anthelmintic treatment of horses with chenopodium mixture are described. One horse developed diarrhoea on the fourth day after treatment and the temperature rose to 104° F. Death occurred in seven days. Another animal had a temperature of 105·8° F. after one day. Diarrhoea developed and death occurred on the eighth day. On autopsy both animals showed acute gastro-enteritis. *Salmonella typhi-murium* was isolated from the intestine and the blood.—D. D. Ogilvie.

Fukano, K. (1940). **Studies on Abortion Salmonellosis in Horses. I. Naturally Occurring Cases.**—*Jap. J. vet. Sci.* **2.** 497–517. [In Japanese: abst. from English summary].

An epidemic amongst horses is described characterized by high fever with a diurnal temperature variation, brownish discoloration of the conjunctiva, localized swellings, abscess formation, and lameness. The results of bacteriological examination and agglutination tests demonstrated *S. abortus-equi* as the causative agent, although mixed infections with *Streptococcus haemolyticus* and *Bacterium equirulis* and complication with infectious anaemia were also found. Acute cases seemed to respond to specific serum therapy, and vaccination of chronic cases gave promising results. Details are given of clinical symptoms and treatment of four cases of infection. Co-existent infectious anaemia frequently became apparent after specific serum therapy.—R. O. Muir.

Rösgen, W., & Schulze-Gahmen. (1939). Kühe als Infektionsquelle für Schottmüller-Erkrankungen. [**Cows as Sources of Paratyphoid**].—*Dtsch. med. Wschr.* **65.** 1514–1516.

An account of three cases of paratyphoid in rural families, two being in children in neighbouring and related families, and the third in a woman who lived some distance away.

The causal organism was recovered with difficulty from the faeces of two cows, one in the first case and one in the third, but the evidence incriminating them was incomplete. In all probability both the children were infected from a " carrier " in their family, whose existence was established.—J. E.

Nohmi, S., Nakajima, G., & Karasawa, S. (1940). **On the *Salmonella typhi-murium* Isolated from Fatal Cases of Acute Gastroenteritis Found Among Imported Sheep.**—*Jap. J. vet. Sci.* **2.** 386–411. [In Japanese: abst. from English summary].

Four out of a herd of imported sheep died at the Yokohama quarantine station from acute gastro-enteritis and a salmonella type of organism conforming to *S. typhi-murium* was isolated from each animal. Intravenous injection of one loopful of organisms set up acute gastro-enteritis in sheep. After one passage through sheep half this dose was lethal.

O and H agglutination and agglutinin-absorption tests confirmed the diagnosis. The antigenic structure according to the Kauffmann-White classification was IV, V, (XII) : i : 1, 2, 3. One of the four strains tested revealed the three types of non-specific flagellar phases only after application of the alternative phase test. —C. V. Watkins.

I. Hindmarsh, W. L. (1940). **Dysentery in Sheep due to Salmonella Infection.**—*Aust. vet. J.* **16.** 112–117.

II. Stewart, D. F. (1940). **The Mortalities among Sheep due to Infection with Species of the Salmonella Group of Bacteria.**—*Ibid.* 169–172.

I. Whenever sheep were held, pending slaughter, for more than a few days in certain paddocks belonging to an abattoir, deaths commenced. In one outbreak about 50 sheep died daily in a group of 2,500. Before death

severe diarrhoea was observed and sometimes there was blood in the faeces. On P.M. examination haemorrhages were usually found in the bowels and epicardium. *S. typhi-murium* was isolated from the organs of several sheep. Cultures of this organism reproduced the disease when fed to sheep. A similar organism was also cultured from stagnant water lying in the paddock.

II. Two epidemics in sheep are described which occurred under severe summer conditions. Complete serological study of the causal organisms showed one to be *S. bovis-morbificans* and the other *S. typhi-murium*. Only once previously have salmonella been reported as causing epidemics in sheep in New South Wales.—W. I. B. Beveridge.

Stewart, D. F. (1940). **The " O " Antigens of *S. cholerae-suis* var. *kunzendorf* Strains Isolated from Pigs in New South Wales.**—*Aust. vet. J.* **16.** 88.

Kauffmann reported that somatic antigen VI of *S. chlorae-suis* could occur in two forms, VI_1 and VI_2, and that 13 of 15 strains studied by him contained only VI_1 and the other two only VI_2. S. examined ten strains of *Salmonella* of the somatic group VI, VII, isolated from pigs in New South Wales and found that all were monophasic in the second phase (*S. cholerae-suis* var. *kunzendorf*) and that all contained the somatic factor VI_1 and none VI_2.—W. I. B. B.

Johnson, E. P. (1941). **A Comparative Study of Pullorum Disease in Barred Plymouth Rock and New Hampshire Red Chickens.**—*J. Amer. vet. med. Ass.* **98.** 301–303.

J. describes an investigation devised to determine whether New Hampshire Red chickens are more susceptible to pullorum disease than Barred Plymouth Rock chickens as it is believed by stock owners and inspectors that the former are more susceptible than other breeds of chickens. Twelve dozen eggs of each breed from the same source, there being an equal record of virtual freedom from pullorum disease in each flock, were incubated and reared in an identical manner at the Virginia Agricultural Experiment Station. No pullorum disease was determined up to the age of five months when 23 B.P.R. and 24 N.H.R. chicks were housed together in contact with two birds which had reacted to the pullorum test on two occasions; also *Salmonella pullorum* broth cultures were given in the drinking water. Two of the B.P.R. chicks and ten of the N.H.R. chicks reacted to periodical tests during a nine-month period.—C. V. Watkins.

Archer, G. T. L. (1941). **A Modification of the Method Usually Employed to Obtain Specific Cultures from Salmonella Group Variants.**—*J. R. Army med. Cps.* **76.** 143–146.

A modification is described of the usual method of growth in the presence of group serum for obtaining specific suspensions from group phase cultures. A third of one limb of a sterile " U " tube is filled with soft agar and the other limb with sterile group serum broth. The upper surface of the agar is inoculated with a loopful of the group variant being examined. Only highly motile organisms should reach the broth by traversing the soft agar and these should be very susceptible to variation of the flagellar antigens, instead of the usual H→O variation. By this technique, specific cultures of *S. thomson* and *S. newport* were obtained from their respective group variants, *S. thomson* var. *berlin* and *S. newport* var. *puerto-rico*.

—R. O. Muir.

Trudel, F. (1939). **The Incidence of Bang's Disease and its Control in the Province of Quebec.**—*Canad. J. comp. Med.* **3.** 235–258.

Following the inauguration of a Service of Animal Health in the province of Quebec in 1937, a definite programme was formulated to deal with Bang's disease to replace the sporadic attempts previously made. The programme was prepared in close conformity with that employed by the Dominion Department of Agriculture with regard to laboratory technique and organization of field work. In 1937–38 tests were made on 14,821 cattle from 644 herds in 57 of the 60 counties in the province, resulting in 4·13% reactors from 23·17% of the herds. The incidence of infection on the sampling represented by the tests ranged from nil to 26%. The highest incidence of infection was found in the environment of the larger cities, *viz*, Montreal, Three Rivers, Quebec, and Sherbrooke.—L. M. Heath.

Ahmed, M. R. (1939). **The Incidence of Contagious Abortion in Domestic Animals in Egypt.**—*Bull. Minist. Agric. Egypt.* No. 231. pp. 29.

Agglutination tests were performed with blood collected at Cairo abattoir from 250 cows,

200 buffaloes, 200 camels, 200 sheep, and 150 pigs. Reactions in a serum dilution of 1 : 100 or higher were taken to indicate infection. [Density of emulsion not stated.] Positive results were obtained in 28 cows, 16 buffaloes, 7 camels and 6 pigs. No positive results were obtained from sheep.—S. J. Gilbert.

Fonseca, T. P. (1939). Coeficiente de infección a brucellas en animales sacrificados en el frigorifico nacional [Uruguay]. **[Brucella Infection in Animals Killed in the National Abbatoir, Uruguay]**.—*Bol. mens. Direcc. Ganad., Montevideo.* **23.** 303–307.

F. carried out agglutination tests on the sera of animals killed in the abattoir. He concludes that 3·9% of bovines generally are infected, the percentage rising to 7·2 in the case of cows. Swine did not appear to be infected to any extent, no swine sera having reached a titre of 1 : 40.

F. notes that of 254 sera giving positive reactions by Huddleson's rapid method, only 218 were positive by the slow test tube method. By Huddleson's method only one pig serum sample agglutinated at 1 : 20.—M. Watson.

Harispe, C. M. (1939). Contribución al estudio epidemiológico de la infección de nuestro ganado bovino con Brucela Abortus. **[Bovine Contagious Abortion in the Argentine]**.—*Rev. Med. vet., B. Aires.* **21.** 11–28.

From 1,000 agglutination tests carried out on sera from various parts of the country H. estimated the incidence of brucellosis in the various districts. The percentage varied from 2·9–100, the average being about 30.—M. W.

Leganoa, J. B., & Vela, E. M. (1939). Introducción al estudio de la brucellosis en el ganado caprino de la ciudad de la Habana. Estudio serológico en 100 casos con una observación interesante. **[Brucellosis in Goats in the City of Havana]**.—*Rev. Med. trop. parasit., Habana.* **5.** 293–302.

The authors submitted to the agglutination test for *Br. abortus* sera from 100 milking goats in Havana. 39% of the sera agglutinated by Huddleson's method, but in an atypical manner giving a granular reaction which the authors consider not specific. By other methods no agglutination tests were positive.

From their experiments the authors conclude that the milking goats of Havana are free from brucellosis.—Miller Watson.

Žarnić, I. (1941). Bruceloza konja u Jugoslaviji. **[Equine Brucellosis in Yugoslavia]**.—*Jugoslov. vet. Glasn.* **21.** 41–55. [Abst. from German summary].

Agglutination and complement-fixation tests were carried out on 388 farm horses, 267 army horses, 96 stud horses, 137 horses from large estates, and 184 horses from Zagreb. Only 22 positive results were obtained, mostly in farm horses. Of 60 horses with poll evil or fistulous withers, 9 reacted positively.

Cameron, H. S., Gregory, P. W., & Hughes, E. H. (1941). **Studies on Genetic Resistance in Swine to Brucella Infection. II. A Bacteriological Examination of Resistant Stock.**—*Cornell Vet.* **31.** 21–24. [For part I, see *V. B.* **11.** 12].

The authors have previously reported an apparent genetic resistance in swine to oral administration of virulent suspensions of *Br. suis*. Animals which showed a consistently negative or incomplete reaction at 1 : 25 were considered resistant and those with titres of 1 : 50 or over were considered susceptible, whilst transient reactions at 1 : 50 or less were classed as undetermined. In this paper investigations to determine whether the resistant group were harbouring brucella are described. Cultures were made from ground-up lymph nodes and two g. pigs were inoculated from pooled suspension. In the susceptible group, growth was obtained from all lymph nodes examined from three out of four pigs proved positive by g. pig inoculation. In the undetermined group, a few colonies were obtained from samples of composite lymph node and spleen of one pig. In the resistant group, occasional colonies were obtained from the submaxillary l.nn. of three out of 17 pigs; two of the three animals had received an infective dose two months before, the third one month before and the rest of the group several months earlier. G. pig inoculations in this group were all negative. These results are presented as evidence that the resistant stock were not carriers of *Br. suis* and that their genetic constitution is an ability to resist infection rather than an inability to produce agglutinins against it.—S. J. Gilbert.

I. Wisnicky, W. (1940). **Vaccination for**

Bang's Disease.—*J. Amer. vet. med. Ass.* **97.** 221–229.

II. Delez, A. L. (1940). **Preliminary Observations on the Duration of Immunity in Cattle Vaccinated in Calfhood with Strain 19 of Brucella Abortus.**—*Ibid.* 581–583.

III. McEwen, A. D. (1940). **Experiments in Contagious Abortion. The Immunity of Cattle Inoculated with Vaccines of Graded Virulence.**—*Vet. Rec.* **52.** 815–819.

I. W. describes the progress made in Wisconsin in the eradication of Bang's disease since the introduction of federal aid in 1934. In 1940, as many as 74% of the 187,000 herds were free from the disease while the remaining 26% were interspersed among the clean herds except in area-tested counties. It is significant that rapid progress in the elimination of the disease has been attained in herds where co-operation of owners, under the area plan, has been secured. One-third of the remaining infected herds are termed " problem herds " in which there is frequent recurrence of infection, and in such herds W. suggests that vaccination might be usefully employed to assist eradication.

The results so far obtained by vaccination of calves with strain 19 indicate that the method does confer some degree of protection, at least during the first pregnancy, but W. aptly comments that

" It is obvious that the amount of critical research work is too small. Field experiments where controlled groups are not maintained under proper observation, even though they are conducted on an extensive scale, can not be relied upon to furnish competent data. It is not possible to evaluate data correctly when the probability exists that two thirds of the infected herds under experiment are in a quiescent stage of the disease."

II. The immunity of nine heifer calves vaccinated with a *Br. abortus* strain of reduced virulence, strain 19, was tested when they were in their second pregnancy. All had completed full-term first pregnancies without evidence of infection. Exposure to a virulent strain of *Br. abortus* took place at the 5th–6th month of pregnancy with a dose of approximately 240 million organisms, while four controls received a similar dose. Six of the vaccinated group gave birth to full-term, living calves and three calved prematurely; *Br. abortus* was demonstrated in these three only. Of the four controls, two gave birth to dead calves, one to a live calf in the eighth month of pregnancy, and the fourth aborted in the seventh month. In the first three, *Br. abortus* was demonstrated in the colostrum and foetal membranes, while material for bacteriological examination was not obtained from the fourth.

III. A series of experiments is described illustrating the resistance established in heifers, by the non-virulent parent strain 45, to infection with the more virulent variants of the strain. It is shown that inoculation with either strain 45 or the more virulent strain 45 (6) confers a slight degree of resistance to infection with 45 (20) during pregnancy, and that the resistance may be increased by combining the use of the first two strains. Three heifers which were inoculated with strain 45 (20) both before and during pregnancy did not become infected and did not develop *Br. abortus* agglutinins in the blood. The immunity of cattle inoculated with 45 (20) was well demonstrated in a group of six heifers which received a standard infective dose of a fully virulent strain (544); none of these animals aborted although three of them were harbouring this organism in the foetal membranes. Three control heifers received a similar dose; all aborted.—S. J. Edwards.

McEwen, A. D. (1941). **The Resistance and Sensitivity of *Br. abortus*-Infected Guinea Pigs.**—*Vet. Rec.* **53.** 183–185.

Infected g. pigs are highly resistant to reinfection. G. pigs infected with CO_2-sensitive strain 544 resisted subsequent infection with a virulent aerobic strain. The reinfecting organism is rapidly removed from the blood-stream and does not become established in the organs or lymph nodes except those local to the point of injection. Intramuscular inoculation of *Br. abortus* into the posterior part of the thigh of infected g. pigs produces an abscess in the popliteal region and intraperitoneal injections cause the omentum to assume the appearance of a thickened band of tissue which may or may not be studded with abscesses. Infected g. pigs are sensitized to *Br. abortus* and die within 24 hours of the intraperitoneal injection of numbers of organisms that cause no marked disturbance in normal animals. Attempts were made to immunize and sensitize g. pigs by single and multiple inoculations of killed cultures of *Br. abortus* and living culture of reduced virulence, but no evidence was found of changes in the omentum or of specific sensitivity.—S. J. Gilbert.

Pagnini, U. (1938). Contributo alla conoscenza dell'infezione brucellare sperimentale delle cavie. [**The Course of Experimental Infection of G. Pigs with** *Brucella*].—*G. Batt. Immun.* **21.** 681–696. [English, French and German summaries]. [Abst. from English summary].

P. found that in a number of cases brucella could not be recovered from g. pigs two months after experimental infection, and only in a few rare cases could positive cultures be obtained from g. pigs with a negative agglutination reaction. Brucella were usually recovered from the spleen and bone marrow, although in a few cases positive cultures could only be obtained from other material. Up to the 20th day of infection, the organisms were most frequently obtained from the liver, spleen, bile, and urine.

In the initial stages and at the peak of infection, cultural diagnosis was slightly more reliable than serological tests, but during the stages of recovery the latter gave definitely better results.

*Rose-Legrand, M. L. (1940). [**Undulant Fever in Normandy**].—*Thesis, Paris.* No. 322. [Abst. from abst. in *Nature, Lond.* **146.** 399].

The author records 27 cases of undulant fever in Normandy during the previous six years; one was infected with *Br. melitensis* and the rest with *Br. abortus*; not a single case was contracted from goats or sheep. In the majority of cases infection was through the skin and only in a minority by the consumption of milk from infected cows.

Rukavina, J. (1940). Aerobna bakterijska flora u crijevima zdravih pataka. [**Aerobic Flora of the Intestine of Healthy Ducks**].—*Vet. Arhiv.* **10.** 268–276. [Abst. from German summary].

The intestines of 25 healthy ducks were examined for aerobes. In all cases *Bacterium coli*, *Bact. coli* var. *acidi lactici* and *Streptococcus faecalis* were found. In addition Gram-positive staphylococci, *Actinomyces*, *Bacillus mycoides*, "*B. praussnitzii*", *B. subtilis*, "*B. mesentericus*", *Bacteroides vulgatus* and bacilli of the *Lactobacillus acidophilus* type were observed. *Bact. coli* predominated.

The nutritional condition of the ducks had no influence on the intestinal flora.

Kraneveld, F. C., & Djaenoedin, R. (1940). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch Indië. XXIV. Het voorkomen van anaërobe microorganismen in de gal van gezonde runderen. [**Anaerobic Diseases of Domestic Animals in the Dutch East Indies. XXIV. Anaerobes in the Bile of Healthy Cattle**].—*Ned.-ind. Bl. Diergeneesk.* **52.** 281–291. [English and French summaries]. [English summary amended]. [For previous parts, see *V. B.* **9.** 376].

Anaerobes are frequently present in the bile of healthy slaughter cattle from central Java. In an investigation carried out from 1934–36, anaerobes were detected in nine out of 50 specimens examined. Between 1939–40, when a more reliable technique was used, 26 out of 50 specimens gave positive results. The following strains were isolated:—*Clostridium welchii*, *Cl. septicum* (including three R strains), *Cl. bifermentans*, *Cl. multifermentans tenalbus*, *Cl. amylobacter*, and *Cl. cochlearium*.

Liver distomatosis was often noted in these cases, but this condition did not appear to bear a constant relationship to the presence of anaerobes.

Rottgardt, A. (1938). Algunas consideraciones sobre el edema gaseoso de los lanares en la República Argentina. [**Gas Oedema in Sheep in the Argentine**].—*Rev. Med. vet., B. Aires.* **20.** 104–120.

This is an account of the causal agents and the incidence of *Clostridium chauvoei*, *Cl. septicum*, *Cl. welchii*, and *Cl. oedematiens* infections in sheep in the Argentine. Lambs and ewes after lambing are mainly affected. No new information is contributed.—M. Watson.

Uenaka, S. (1938). Ueber die immunisatorische Einteilung von Rauschbrand- und Pararauschbrandbazillen. [**Differentiation of Blackleg and Malignant Oedema Bacilli by an Immunization Method**].—*Z. ImmunForsch.* **93.** 236–240.

By agglutination and agglutinin-absorption tests, U. found that 21 strains of *Cl. chauvoei* were antigenically alike, whereas there were five types in 22 strains of *Cl. oedematiens*. These serological results were confirmed by the toxin-antitoxin reactions of the strains.—S. J. E.

Skoković, L. (1940). Prilog dijagnostici uzročnika plinovitih edema na temelju

njihovih imunobioloških svojstava. [**Diagnosis of Gas Oedema Infections by an Immuno-Biological Process**].—*Vet. Arhiv.* **10.** 305–319. [Abst. from German summary].

G. pigs and sheep immunized against *Clostridium chauvoei*, *Cl. septicum*, *Cl. oedematiens*, or *Cl. welchii* (separately) withstood infection by the homologous organism, but succumbed to infection by either of the other three organisms, proving that all four bacterial species are immunologically distinct.

HAYWARD, N. J. (1941). **Rapid Identification of Cl. welchii by the Nagler Reaction.**—*Brit. med. J.* May 31st. 811–814.

Details are given of a technique for the rapid diagnosis of *Clostridium welchii* infection, apart from routine morphological and cultural tests. The test, which is based on Nagler's reaction involving the production of turbidity in human serum by *Cl. welchii* toxin, was applied to *Cl. welchii* strains, mostly recently isolated from wounds in man, and to anaerobes other than *Cl. welchii*. Fifty-six of 58 *Cl. welchii* strains gave strongly positive reactions, while 9 from the 174 strains of other anaerobes gave feebly but definitely positive reactions. Inoculation of a mixture of equal parts of human serum and Fildes's broth with a single *Cl. welchii* colony gave a strong positive reaction in 80% of tests after anaerobic incubation at 37°C. for two days. The reaction was specifically inhibited by *Cl. welchii* antitoxin, and was regarded as a very useful addition to the routine litmus milk test which gave less constant and less easily elicited positive results. *Cl. welchii* could be detected on human-serum-Fildes's agar plates within 24 hours.—R. O. M.

PASTERNACK, J. G., & BENGTSON, I. A. (1940). **The Experimental Pathological Changes Produced by the Toxin of *Clostridium histolyticum* in Animals.**—*Publ. Hlth Rep., Wash.* **55.** 775–784.

Cl. histolyticum produces a powerful proteolytic toxin and haemolysin. Rats and mice are relatively resistant to the action of the toxin, while g. pigs and rabbits are moderately susceptible. The effects of the toxin when inoculated into g. pigs and rabbits by different routes are described. With extreme effects there is denudation of bone and even spontaneous amputation of a leg. There is, however, only slight systemic action. Lesions occur in the spleen, liver, and kidneys.

DRAGUTIN. (1941). **Prilog aktivnoj imunizaciji, patogenezi i terapiji tetanusa. [Active Immunization against, Pathogenesis, and Treatment of Tetanus].**—*Jugoslov. vet. Glasn.* **21.** 23–31. [Abst. from German summary].

Horses were successfully immunized against artificial infection by two doses of alum toxoid given at an interval of one month. Two control horses, artificially infected, were treated, one unsuccessfully by large doses of antitoxin injected round the infection site, intravenously, subcutaneously, and intramuscularly and by $NaHCO_3$ intravenously and chloral hydrate *per os*, whilst the other was successfully treated with antitoxin around the infection site and $KMnO_4$ given intravenously.

I. ROBERTSON, D. M. (1939). **Botulism.**—*Canad. J. comp. Med.* **3.** 242–244.

II. MITCHELL, C. A., WALKER, R. V. L., & MCKERCHER, D. G. (1939). **Isolation of Cl. Botulinus from Oat Grain.**—*Ibid.* 245–247.

I. R. briefly reviews the knowledge on botulism, and points out that disease due to Type A occurs in the western part of the North American continent, while Type B is usually found in the eastern portion. He records a small outbreak affecting four horses. Two of the animals died before treatment; the other two were treated with botulism antiserum and one survived. Serum treatment was supplemented, in the animal that recovered, by intraperitoneal and intravenous inoculations of saline and glucose solution.

II. Various types of fodder were collected from the premises in which the outbreak described in I occurred. *Clostridium botulinum* Type B was recovered from the oats. The method of determining and typing the organisms is described. No previous reference to botulism caused by oats could be found in the literature.—L. M. HEATH.

VENNESLAND, B., & HANKE, M. E. (1940). **The Oxidation-Reduction Potential Requirements of a Non-Sporing, Obligate Anaerobe.**—*J. Bact.* **39.** 139–169.

Studies were made of the course of changes in oxidation-reduction potential and pH in the growth on glucose nutrient broth and on synthetic medium of *Bacteroides vulgatus* and *Alcaligenes faecalis*. By this method, however, it was impossible to determine a positive

potential limiting the growth of *Bact. vulgatus*. Potentials of cultures of *Bact. vulgatus* on glucose nutrient broth were controlled by a mixed stream of N_2 and O_2, and in this way the potential first limiting growth was found to be + 0·150 v. at pH 6·6. CO_2 was essential for the growth of this organism and glucose brain-broth cultures were found to show a marked O_2 consumption. In the light of these and other findings a theory of anaerobosis (not entirely original) is proposed and the relation of this theory to a potential limit for anaerobic growth and to O_2 consumption is discussed.—A. EDEN.

ARK, P. A., & HUNT, M. L. (1941). **Saprophytes Antagonistic to Phytopathogenic and other Microorganisms.**—*Science*. **93**. 354–355.

Two soil bacteria were isolated which showed a strong antagonism both to bacteria and to certain fungi. One organism was not identified; the other was *Bacillus vulgatus*. On solid media a sterile area was observed around colonies of these bacteria and growth of other organisms was rapidly inhibited in liquid media. The bactericides produced were water soluble and heat stable. The bactericidal substance of *B. vulgatus* was not adsorbed by a Chamberland L_3 filter, and it remained active after autoclaving for 10 min. at 20 lb. pressure. The bactericidal activity was not affected by changes in pH concentration of media from 4 to 10. The substance could not be precipitated by chemical means; the bactericidal material of culture media could be concentrated by evaporation to dryness. Numerous bacteria and fungi were tested against these organisms including *Salmonella pullorum*, *S. typhi*, *Staphylococcus aureus*, and *Mycobacterium phlei* which were all inhibited in growth.—E. C. HULSE.

VAN LOGHEM, J. J. (1940). **The Significance of the Conceptions Genotypus and Phaenotypus to Bacteriology.** — *Rep. Proc. 3rd int. Congr. Microbiol. 1939*. pp. 98–106. New York: International Association of Microbiologists. [In English].

The author defines the terms "genotypus" and "phaenotypus" as, respectively, the complexes of hereditary and of morphological and environmental factors in the constitution of an organism, and gives illustrations from the higher animals. He discusses the significance of bacterial variation accepted by him as the totality of the adaptive functions of the bacterial individuality. Striking examples are given of how far the alteration of the bacterial individual may go without true change in the genotypical constitution. Permanent loss of specific properties, whether cultural or pathological, is discussed with instances of regression and degeneration. Consideration is also given to the questions of bacterial types within a species, of permanent loss of function described as atrophy and mutilation, and of the acquisition of new functions by degenerate bacteria. —R. O. MUIR.

HENRICI, A. T. (1940). **Characteristics of Fungous Diseases.**—*J. Bact.* **39**. 113–138.

A presidential address delivered to the Society of American Bacteriologists. The nature of the parasitism of fungi in the mycoses is thoroughly discussed. The question of mycotic allergy and its relation to the allergy of tuberculosis and other bacterial infections in which allergy plays a part is originally treated. The article should be read by all interested in bacterial infections.—D. L. HUGHES.

DISEASES CAUSED BY PROTOZOAN PARASITES

JOHNSON, C. M. (1941). **Bovine Trypanosomiasis in Panama.**—*Amer. J. trop. Med.* **21**. 289–297.

T. vivax infection was detected in two herds of cattle in the Aguadulce area and in a dairy herd near Panama City during the summer of 1940. It is considered that it was most probably introduced from South America during the previous five years, as CLARK who was investigating the animal reservoirs of *T. hippicum* in 1935 did not encounter it. An observation is recorded which suggests that the dairy herd became infected by the movement of cattle from the Aguadulce area. Inoculation into goats, cattle, and horses was successful, but the small laboratory animals proved refractory. The trypanosome caused fever and anaemia in cattle and goats, but apparently little mortality. No reaction could be detected in horses and it is suggested that they may act as a reservoir host.—U. F. RICHARDSON.

CURASSON, G. (1940). L'importance sociale et économique des trypanosomiases animales. [**Social and Economic Im-**

portance of Animal Trypanosomiasis]. —*Bull. Serv. zootech. Epiz. A.O.F.* **3.** 145–151.

It is pointed out that trypanosomiasis causes a deficiency in transport animals and a shortage of human protein food. The former means that human labour must be utilized for transport with consequent decrease of labour for other purposes. Shortage of protein leads to malnutrition, a low birth-rate, high susceptibility to disease, and may lead to cannibalism.

Although rinderpest causes heavier losses than trypanosomiasis, it does not affect as many species of stock, and the epizootics pass without leaving an enfeebled stock population. Apart from social and economic disabilities resulting from trypanosomiasis, the danger is stressed of introducing the disease into non-tsetse areas such as Guadeloupe, South America, and Martinique.—U. F. RICHARDSON.

HALLAUER, C., & KUHN, C. (1940). Ueber die Dauerzüchtung von Naganatrypanosomen und Rückfallsfieberspirochäten im befruchteten Hühnerei. [**Prolonged Cultivation of *Trypanosoma brucei* and of *Spirochaeta recurrens* in the Fertilized Hen's Egg**].—*Z. Hyg. InfektKr.* **122.** 406–411.

The maintenance is recorded of a strain of *T. brucei* in embryo chicks for 22 passages over a period of 2½ months, the subinoculations ceasing only when no more fertile eggs were available. The organisms retained their pathogenicity to mice throughout the cultivation. Eggs which had been incubated 10–12 days were used for inoculation; death of the embryo occurred about the fifth day, so that subinoculation had to be undertaken every third or fourth day. If embryos over 12 days old were inoculated more resistance was shown, and the chick might hatch but always died the same day. Ten-day-old chicks were still susceptible and died from the infection, but three-week-old chicks, though they might show symptoms, always recovered.

For the first 10–12 egg passages the trypanosomes occurred as plump, broad forms or narrow, slender forms without free flagella, but after the 15th passage the typical flagellated form, as seen in the mouse, reappeared. It is suggested that maintenance of trypanosome strains in chick embryos is not practicable owing to the difficulty of the technique, but this method of maintenance may be of value in work on chemotherapeutics. Trypanosomes could not be maintained in pigeon or duck eggs. —U. F. RICHARDSON.

COOK, A. (1941). **How Sleeping Sickness Came to Uganda.**—*E. Afr. med. J.* **17.** 404–413.

This article is a general account of the early work on sleeping sickness in Uganda. Up to the end of 1900 not much was known of the disease except that it occurred in the Congo and West Africa, and that MANSON had suggested that the causal organism was *Filaria* [=*Dipetalonema*] *perstans*. The first cases recognized in Uganda occurred in 1901, and in 1903 the first Sleeping Sickness Commission was sent out under CASTELLANI who discovered trypanosomes in the cerebrospinal fluid, but attached no importance to them. In 1904, BRUCE ascribed the disease to trypanosomes, and later obtained proof that it was transmitted by *Glossina palpalis*.

In 1906 the population was evacuated from the tsetse-infested islands of Lake Victoria. Between 1900–1906 the population of the implicated districts of Uganda was reduced from 300,000 to 100,000, but as a result of the team work of the research commissions, the disease is now so much under control that in 1939 only 504 cases were recorded in the Protectorate and only a single case occurred in the Lake Victoria area.—U. F. RICHARDSON.

WOTTON, R. M. (1940). **A Study of the Mitochondria of Trypanosomes.**—*Quart. J. micr. Soc.* **82.** 261–266.

It had been suggested that the cytoplasmic granules occurring in trypanosomes were mitochondria. In a study of these, W. found that in adult trypanosomes mitochondria occurred as slender, rod-shaped bodies, rarely more than 12 in number, arranged parallel to the long axis of the body. In division forms they might be arranged transversely, and might be collected at one end of the cell, or grouped round the nucleus.

Fatty granules also occurred in the cytoplasm. The parabasal body was found to be osmiophilic, and may be analogous to the Golgi apparatus.—U. F. RICHARDSON.

DIAS, E. (1939). O gênero Schizotrypanum Chagas, 1909. [**The Genus *Schizotrypanum* Chagas, 1909**].—*Mem. Inst. Osw. Cruz.* **34.** 193–211.

After reviewing present knowledge of the

subject, D. concludes that the creation of a special genus for *S. cruzi* is justified on the following morphological and biological grounds :– The organism exists in leishmania-like forms during multiplication, although it is trypanosome in type in the blood. Multiplication of the leishmanial form occurs in the tissues and not in the blood. No known trypanosome has these characters. *S. cruzi* in its trypanosome form resembles pathogenic trypanosomes and may be lethal to man and animals, but it is easily cultivated, and differs from trypanosomes in its development in the insect and its mode of transmission. It appears to occupy a place between *Leishmania* and *Trypanosoma*.—Miller Watson.

Mazza, S., Miyara, S., & Sanjurio, H. E. (1936). Comprobación de animales domésticos y de nuevas especies de mamíferos silvestres portadores de Schizotrypanum cruzi en los alrededores de la ciudad de Mendoza. **[Domestic and other Animal Carriers of *Trypanosoma cruzi* in Mendoza]**.—*9th Reun. Soc. argent. Pat. Reg. N.* **1.** 548–559.

The authors report the finding of *T. cruzi* in the blood of domestic cats, dogs, a wild canine (*Pseudalopex culpaeus culpaeus*) and a ferret-like animal (*Grisonella ratellina*). The two last were in captivity in the local zoological collection. —Miller Watson.

Talice, R. V. (1938). Primeras observaciones en el Uruguay de gatos espontáneamente infectados por el *Trypanosoma cruzi*. **[First Observation in Uruguay of Natural *T. cruzi* Infection of Cats]**.—*Arch. Urug. Med.* **13.** 61–65.

Two cases are reported. The first concerned a four-month-old cat, apparently healthy, owned by a family of which one member, a boy of seven, had suffered from acute *T. cruzi* infection. Thick blood films from this cat showed typical forms of *T. cruzi* in small numbers. The parasites were large and had large double blepharoplasts.

The second case was of a young cat from a house in which two of the inhabitants had suffered from Chagas' disease. The cat was kept under observation for some time. It had periodical convulsions and attacks of posterior paresis. Trypanosomes could not be found in the blood. Rats inoculated intraperitoneally with the cat's blood, however, became infected. —Miller Watson.

Mazza, S., & Jörg, M. E. (1936). Nódulos gliósicos en cerebro de perro con esquizotripanósomiásis experimental. **[Brain Lesions in a Dog Artificially Infected with Chagas' Disease]**.—*9th Reun. Soc. argent. Pat. Reg. N.* **1.** 284–305.

The authors discuss the development of nodular encephalitis in this infection and review the various theories of cerebral inflammation. They also describe the lesions found in the cerebrum of a dog experimentally infected with *Trypanosoma cruzi*. There were lesions in the occipital region, a leptomeningitis with considerable thickening and congestion being present. Nodules in the white matter were similar to those found in syphilis and human epidemic encephalitis. In some of the smaller nodules leishmanial forms of *T. cruzi* were found.—Miller Watson.

Christensen, J. F. (1940). **The Source and Availability of Infective Oöcysts in an Outbreak of Coccidiosis in Lambs in Nebraska Feedlots.**—*Amer. J. vet. Res.* **1.** 27–35.

Much light is thrown on certain problems in the epizoology of coccidiosis under feedlot conditions by this study of an outbreak in feeder lambs in central Nebraska. It was found that infection was introduced by lambs themselves and examinations were made for viable sporulated oocysts in the water supply, feed materials, and sites round about occupied feedlots to determine how the infection was acquired by lambs in sufficient degree to bring about clinical coccidiosis. It was found that faecal contamination of drinking water was negligible ; that dried faecal matter or dried manure from the ground did not materially contaminate feed materials. The ideal medium for the development and continued viability of oocysts was found to be corn silage fed in open troughs that were never cleaned. The conclusion is reached that all chopped feeds fed in uncleaned open troughs are dangerous sources of infection in wet weather.—C. H. S.

Porter, R. J., & Huff, C. G. (1940). **Review of the Literature on Exo-Erythrocytic Schizogony in certain Malarial Parasites and its Relation to the Schizogonic Cycle in Plasmodium elongatum.**—*Amer. J. trop. Med.* **20.** 869–888.

The fundamental difference between the asexual cycles of *P. elongatum* and other avian

plasmodia is that, in the former, morphologically identical stages occur in a complete series of cells from haemocytoblasts to erythrocytes, whilst large non-pigmented schizonts have been observed in endothelial cells, monocytes, and macrophages in infections with some strains of *P. relictum*, *P. gallinaceum*, *P. cathemerium*, *P. circumflexum*, and possibly *P. nucleophilum*. Similar forms have been found in human infections with *P. vivax* and *P. falciparum*. Evidence at present available seems to prove that the exo-erythrocytic schizonts are part of the cycle of malarial parasites and not stages of other organisms, such as toxoplasms, mixed with those of malaria, as they have not been separated from malaria nor shown to occur apart from it, and as their morphology differs according to, and their immunological specificity parallels, that of the associated malaria.

Of anti-malarial drugs, plasmoquine alone appears to reduce the number of the exo-erythrocytic stages. There is some evidence to suggest that these schizonts may be the early developmental stages of sporozoites.—M. L. B.

GINGRICH, W. D. (1941). **The Role of Phagocytosis in Natural and Acquired Immunity in Avian Malaria.**—*J. infect. Dis.* **68.** 37–45.

The introduction of foreign materials into animals has been applied in many ways, with a view to discovering the mechanism and significance of phagocytosis and other macrophage functions in relation to resistance to infection. Various workers have demonstrated the role of the splenic, hepatic, and bone-marrow macrophages in phagocytosing and digesting the damaged red blood cells in cases of malaria. The use of injections of washed foreign avian r.b.c. as a method of blockading the macrophages (a condition where the macrophages are so occupied in dealing with foreign particles that they are inefficient in removing parasitized r.b.c. from the circulating blood) is worthy of consideration and is dealt with in this paper. It was found that a single injection into canaries of 1 c.c. of a 50% suspension of foreign avian r.b.c. succeeded in blockading the macrophages for eight hours. A different type of r.b.c. taken from chickens, pigeons, and ducks respectively, was used for each period of three days. These foreign r.b.c. were found to be non-toxic to canaries. By this method no effect was observed on the daily rate of increase in numbers of *Plasmodium cathemerium* during the acute rise of infection, and it was therefore concluded that phagocytosis was not the most important factor in effecting the two-thirds mortality of parasites in natural immunity. On the other hand, the prevention of a crisis and subsequent recovery as well as the effecting of relapses can be produced, indicating that phagocytosis is an active and important factor in the acquired immunity to malarial infection.
—C. HORTON SMITH.

GINGRICH, W. D. (1941). **Immunization of Birds to Plasmodium cathemerium.**—*J. infect. Dis.* **68.** 46–52.

Experiments are described to determine whether an effective immunity could be produced in canaries by imitating an acute infection by injection with killed parasites. It was found that a considerable degree of immunity, as gauged by subsequent low-grade infections and early recoveries, was obtained by administering formalin-killed and heat-killed parasites in 12 intravenous injections of 1 c.c. of a 50% suspension of red blood cells which were 40–60% parasitized. With reduced dosages of 0·15 c.c. eight injections failed to stay the height of infection, but most of the birds recovered. Hyperimmunization with 12 injections of 1 c.c. of the suspension of heat-killed parasites failed to overcome latent infection although in one case the number of parasites in the blood was so reduced that intravenous transfer of 0·3 c.c. failed to produce a traceable infection in a healthy bird.—C. H. S.

PONS, J., & URTEAGA, O. (1939). Variaciones de la aminoacidemia en enfermos de verruga peruana y en perros infectados con Bartonella canis. [**Variations in the Amino-Acid Content of the Blood in Verruca Peruviana and in Dogs Infected with *B. canis***].—*Rev. Cienc., Lima.* **41.** 235–243.

The blood from a number of dogs infected with *B. canis* was examined, and it was found that there was a very marked increase in the blood amino-acids in the haematic stage of the infection.—MILLER WATSON.

NEITZ, W. O. (1939). **The Immunity in Heartwater.**—*Onderstepoort J. vet. Sci.* **13.** 245–283. 2 appendixes.

The experiments here described were undertaken in order to determine (a) the duration in sheep of immunity to heartwater and whether immunologically different strains exist, and

(b) how the immunity is maintained. Among ten strains from different parts of South Africa no immunological difference was observed. During the observation a new virus was encountered to which the name "virus A" was given. The mortality from this virus was less than 2% and it appeared to be harboured by some of the passage sheep. Unlike the causal agent of heartwater, this virus produces a mild reaction in horses. The duration of immunity was solid in all cases up to six months and in varying periods up to 58 months after recovery. In a few cases from 7–34 months after recovery, febrile reactions due to the test injection occurred. It is suggested that these partially immune animals may act as maintainers of heartwater in treks where fully susceptible animals are absent. Splenectomy in recovered cases did not cause a relapse of heartwater. *Rickettsia ruminantium* could not be demonstrated in recovered sheep at periods longer than 60 days after inoculation.

—E. M. Robinson.

Mason, J. H., & Alexander, R. A. (1940). **The Susceptibility of the Ferret to Heartwater.**—*J. S. Afr. vet. med. Ass.* **11.** 98–107.

A summary of the attempts made by the authors to transmit heartwater to the ordinary laboratory animals and a description of the methods employed, all of which resulted in failure, are given at the commencement of this article. When ferrets were first employed, reactions occurred due to an infection of unknown origin. Later it was found possible to maintain the causal agent of heartwater in ferrets for a number of generations whilst another infection was maintained at the same time, apparently with the unknown virus. A double temperature reaction occurred in sheep, the first being caused by the unknown virus and the second by heartwater. After the fifth generation in ferrets the virus of heartwater died out. No attenuation was observed. The only symptom produced in ferrets was a temperature reaction.—E. M. Robinson.

Webb, J. L. (1940). **The Occurrence of Rickettsia-Like Bodies in the Reduviid Bug *Triatoma rubrofasciata* and their Transmission to Laboratory Animals.**—*Parasitology.* **32.** 355–360.

As a result of detecting rickettsia-like bodies in heart sections of white mice on which specimens of *T. rubrofasciata* had been fed, an examination was made of the bugs. Rickettsia were detected not only in adults but also in larvae and eggs, so that it is presumed that the infection of the bugs is hereditary.

By the inoculation of bug faeces, infection was established in mice, rats, and g. pigs, but no clinical symptoms developed except for a slight febrile reaction in some of the g. pigs. Brain lesions, consisting of proliferation around damaged capillaries and perivascular infiltration, were found to occur in infected g. pigs.

—U. F. Richardson.

Yamamoto, S. (1940). **Leptospirosis of Dogs in Japan. I. Aetiology of Stuttgart Disease and Serological Characteristics of Strains of Leptospira found in Dogs in Japan.**—*Jap. J. vet. Sci.* **2.** 39–74. [In Japanese: abst. from German summary].

Although a disease of dogs resembling Stuttgart disease has been recognized for many years in Japan, no proof of its leptospiral origin has previously been obtained. Two cases of acute disease are now recorded, from one of which a pure culture of a leptospira was obtained, and with this strain clinical Stuttgart disease was produced in an experimental dog. Leptospira were also isolated from cases of canine infectious jaundice, and from 11 dogs which exhibited symptoms of neither jaundice nor Stuttgart disease.

Of the 14 strains of leptospira isolated, three were classified by agglutination results as *L. icterohaemorrhagiae* and 11 as *L. canicola*. The pathogenicity for g. pigs of the *L. canicola* strains varied considerably, some causing jaundice, haemorrhagic extravasations, and death, and others failing to cause death even after repeated passage through g. pigs. The general pathological finding was a stimulation of the reticulo-endothelial tissue.—U. F. R.

I. Bessemans, A., Wittebolle, P. A., & de Borchgrave, D. (1938). Sur l'agglutination et la lyse des leptospires sous l'action de leurs antisérums homologies. [**Agglutination and Lysis of Leptospira under the Influence of their Homologous Antisera**].—*Rev. belge Sci. méd.* **10.** 309–327.

II. Carlinfanti, E. (1940). Sur un antigène contenu dans les leptospires pathogènes et sur la presence de ses anticorps dans le sérum des malades. [**An**

Antigen of Pathogenic Leptospira and the Presence of an Antibody to it in the Serum of Affected Animals].—*Boll. Sez. ital. Soc. int. Microbiol.* **12.** 133–135. [In French].

I. The authors give a review of the literature on the presence of agglutinins and lysins in the sera of animals immune to leptospira, and then record their own observations as to the presence of these substances in the sera of animals infected with 14 different strains of leptospira. It is concluded that both lysins and agglutinins to homologous leptospiral strains occur in the sera of affected animals. The lysins are usually only detectable at low dilutions, but there is considerable variation in this respect. In medium dilutions agglutination occurs first, being followed by lysis, but lysis may be so rapid that the agglutination is not detected. With higher dilution lysis may not occur.

II. C. claims to have discovered in leptospira an antigenic substance which is extractable by alcohol, and is common to many different species. Antibodies to this antigen occur in anti-leptospiral sera, but not in other sera, such as syphilitic. By extraction at 50°C., followed by desiccation, an increase in antigenic activity, with a decrease in the anticomplementary property, is obtained. It is claimed that antibodies to this antigen occur in affected animals, and as the antigen is common to all species, the complement-fixation test will detect a leptospiral infection without the necessity of testing the serum against five or six different species of organisms. Sera from animals immunized against various bacterial infections were all negative to tests for the presence of antibodies to this antigen. No detailed description is given of the work on which these claims are based.—U. F. RICHARDSON.

MEYER, K. F., STEWART-ANDERSON, B., & EDDIE, B. (1939). **Epidemiology of Leptospirosis.**—*Amer. J. publ. Hlth.* **29.** 347–353.

Since 1927, 11 cases of Weil's disease in human beings have been reported from California; in nine cases the patients had been in contact with water or sewage and in two cases (veterinarians) with dogs. A survey of the rat population revealed leptospira in the kidneys in 176 of 467 rats. The sera of the two veterinarians agglutinated to high titres *L. canicola* in one case, and *L. icterohaemorrhagiae* in the other; both patients had handled dogs with Stuttgart disease. Observations were made over a period of two years on dogs in California; in one part of the enquiry, examination of dogs that died in a San Francisco veterinary hospital revealed haemorrhagic lesions of Stuttgart disease in 38, and the lesions of "yellows" in 42. Seven had shown both types, but death occurred during the icteric stage. Leptospira were demonstrated in the organs of dogs with each type. Cultures of strains serologically identical with *L. canicola* were obtained in 11 cases. The incidence of canine leptospirosis in California is unknown, but serological tests made on 47 normal dogs showed that 34% gave positive reactions to *L. canicola*. *L. icterohaemorrhagiae* infection was detected in three of 111 dogs examined in New York, where ten agglutinated *L. canicola*.—M. L. BINGHAM.

DISEASES CAUSED BY VIRUSES

—. (1939). Organisation internationale de la vaccination contre la fièvre aphteuse. **[International Organization of Vaccination Against Foot and Mouth Disease]**. —*Bull. Off. internat. Epiz.* **19.** 55–58.

Following the resolution passed unanimously by the Committee of the *Office International des Epizooties* at its May-June 1939 session, concerning the establishment of an international agreement for the production and utilization of a F. & M. disease vaccine of proved value, the delegates were, in a letter from the President, called upon to approach their governments regarding their co-operation in such an international scheme.

As mentioned in the resolution, the vaccine produced at the Riems institute in Germany was the only one which had had a wide application in practice and had been proved to be efficient. Similar vaccines were being produced in Denmark and Italy, but it was hoped that, if there were sufficient response, an international agreement could be drawn up. Under this agreement, other State-controlled centres would produce a standardized vaccine in sufficient quantity to enable the veterinary services of all the countries to maintain a stock of the vaccine for immediate use, along with other measures, at an initial outbreak of the disease. By collaboration between these

centres, an ample supply of vaccine would be available should the initial outbreak not be controlled.—H. H. SKINNER.

SEELEMANN, M., & SIEMONSEN, K. (1940). Ueber den Einfluss der MKS.-Infection auf den Gesundheitszustand des Euters. **[Influence of Foot and Mouth Disease on the Condition of the Udder]**.—*Dtsch. Tierärztl. Wschr.* **48.** 85–88.

A marked increase in mastitis was observed in dairy herds following outbreaks of F. & M. disease. Most of the cases were associated with specific teat lesions due to the F. & M. infection, but such lesions were not followed by mastitis in many cases.—H. H. SKINNER.

NAKAMURA, J., & WAGATUMA, S. (1940). **Complement-Fixation Reaction in Rinderpest. VI. Production of Antibody.**—*Jap. J. vet. Sci.* **2.** 257–276. [In Japanese : abst. from English summary]. [For previous parts, see *V. B.* **11.** 22].

These investigations were made to study problems involved in the production of complement-fixing antibody of rinderpest. In the first experiment 33 calves were used ; 17 received virulent blood 14–16 days after a dose of toluolized vaccine. Only two had any reaction and these recovered after showing moderate symptoms. The other 16 were given simultaneous serum and virus injections. The majority showed more or less severe symptoms and recovered after a 3–7 days' reaction. Serum specimens obtained several times, at weekly intervals, from all these calves after the virus inoculation or recovery from febrile symptoms, gave negative results when tested for their activity against the boiled extract of infected lymph node of known antigenic property.

In the second experiment sera were collected from three groups of cattle, which had been hyperimmunized by repeated injections of large doses of different virulent materials *i.e.* lymph node emulsion (1 : 10) to 11 animals, spleen emulsion (1 : 10) to nine, and undiluted citrated blood to nine others. The blood sera of all these cattle were compared for their activity on the same boiled extract of infected lymph node. The results were most favourable in the lymph-node group, while those of the spleen group appeared a little superior to the blood group. Tests showed that there was no specific influence of tissue component, which is contained in the immunogenic and antigenic fluids, upon the results of the reaction, at least in the two antigens on which the results of cross-tests were recorded, *viz*, the boiled extracts of lymph node and spleen and their corresponding sera.

Observations made on calves concerning the production of rinderpest antibody and also tissue iso-antibody during immunization with infected lymph node showed that, out of four animals given basal immunity by serum and virus injection and then given weekly injections of lymph-node emulsion, rinderpest antibody became demonstrable after five injections of emulsion in three of the calves but not at any time in the fourth calf. All the calves gave good quality reacting serum for tissue iso-antibody. This antibody seemed to appear slightly earlier and it is suggested the production of the two antibodies is controlled by quite different mechanisms.

Hyperimmunization was attempted with boiled extract of infected lymph node to determine whether it can serve as a full antigen for antibody production in the calf ; five calves were given repeated injections of large doses of this fluid. Two had previously received serum-virus treatment and these yielded sera reacting strongly positively with rinderpest antigen, but not with tissue antigen. In the other three calves, which had received no previous treatment, neither rinderpest nor tissue antibody was demonstrated. Although the number of examples may be too few to give a definite conclusion, it seems probable that infection in the two calves, which followed preliminary serum-virus injection, had an effect on the positive result of hyperimmunization with boiled antigen, though the infection itself did not cause production of demonstrable antibody. Positive sera can be employed for the detection of rinderpest antigen in raw extracts of infected cattle tissues, as they do not contain iso-antibody against the tissues, unlike ordinary antisera from animals hyperimmunized with raw extract of infected lymph node. The immunity of the five calves was tested with virulent blood. The two previously infected gave no reaction. The three others gave a rinderpest reaction and one died. It is suggested that the two recoveries were due to an immunity acquired through the repeated treatment with boiled antigen.—J. A. G.

LE ROUX, G., & TRAN-NGOC-HOAN. (1939). Étude de la valeur immunigène des

amygdales des veaux atteints de peste bovine expérimentale. **[Immunogenic Value of the Tonsils of Calves with Experimental Rinderpest].**—*Bull. Soc. Path. exot.* **32.** 182–187.

In these studies the antigenic value of tonsils and lymph nodes taken from the same infected animals is compared. The vaccines were prepared with toluene and the animals were inoculated with virulent blood 15 days after vaccination. A comparison of the reactions following a varying dosage of vaccine showed that the tonsils possessed an immunizing value which is 1½–3 times greater than that of lymph nodes.—S. J. Gilbert.

Mohler, J. R. (1941). **Report on Infectious Equine Encephalomyelitis in the United States in 1940.** pp. 4. Washington, D.C.: U.S. Dep. Agric. [4to] [Mimeographed].

In 1940, 16,941 cases of E.E. were reported in the U.S.A. with 4,187 deaths (about 25% mortality); the general incidence of the disease was about 2·58 cases per 1,000 horses and mules. An increase in incidence over 1939 was noted in the Pacific Coast states, *viz*, Idaho, Nevada, New Mexico, North Dakota, South Dakota, Kansas, Iowa, and Oklahoma, extremely high incidence occurring in a few localities in some of these states. As in 1939 a small number of cases was reported as early as January and February from states then experiencing freezing weather, and M. emphasizes that without laboratory confirmation such diagnoses must remain open to question. [For the figures for 1939 see Schoening *et al.*—*V. B.* **11.** 597.]

Actual reports were received of the vaccination of 257,948 animals, but from other information it was estimated that probably 1,000,000 horses were vaccinated. The investigations of the Bureau of Animal Industry into the intradermal method of vaccination [see also Schoening *et al.*—*V. B.* **11.** 443.] has led to the general adoption of that method, and so far no bad results or deaths have been noted. It was reported that 129 vaccinated animals developed E.E. after the lapse of sufficient time for immunity to develop, and the somewhat indefinite information on the disease in vaccinated animals emphasizes the desirability of continued observation of treated animals and special examination in suspected instances of failure of vaccination to protect against the disease.

A table and a map are given showing details of the distribution of E.E. in the U.S.A.

Simmons, J. S. (1939). **Transmission of Encephalomyelitis in the Horse and Possible Vectors in the Human Being.**—*New Engl. J. Med.* **220.** 956–958.

This article is a general review of the isolation of the two types of E.E. virus, with special reference to the part played by vectors in the transmission of the disease under natural and experimental conditions. There are no new observations.—R. E. Glover.

Zichis, J., & Shaughnessy, H. J. (1940). **Experimental Western Equine Encephalomyelitis. Successful Treatment with Hyperimmune Rabbit Serum.**—*J. Amer. med. Ass.* **115.** 1071–1078.

The authors showed that both mice and g. pigs infected with Western E.E. can be treated successfully with immune serum if the dose is given within 48 hours of infection, or, in g. pigs, immediately upon the first sign of fever, which is usually within 3–5 days of infection. About two-thirds of animals treated at the first sign of disease other than pyrexia also recovered; most of the animals treated after paralysis had set in did not recover.

Animals which recovered after treatment within 48 hours of infection showed no resistance to later injection of virus, thus showing that only a passive immunity has been conferred, but animals treated after the first symptoms had appeared, later resisted large intracerebral doses of virus.

The serum used in these experiments was of high potency, about ten times that of commercial horse serum, and was produced by the hyperimmunization of rabbits. The authors also tested commercial horse serum and found that it had no value when injected either after onset of disease or 48 hours after infection, but was successful when given 24 hours after infection, thus showing the importance of high potency in therapeutic sera.

The brains of four of the animals which recovered after treatment were examined histologically, in two cases 12 days after injection of serum and in two other cases 28 days after treatment. These examinations showed that widespread damage to the C.N.S. had occurred, but that the inflammatory reactions and destructive changes were receding when the animals were killed.

GWATKIN, R., & MOORE, T. (1940). **Indication of the Presence of the Virus of Equine Encephalomyelitis in Brain of Ground Squirrel.**—*Canad. J. comp. Med.* **4.** 78–82.

Suspensions of pooled tissue were prepared from the brains of 127 ground squirrels (*Citellus richardsoni*) caught in the wild state, pooled samples from 3–8 brains being used in each instance; two g. pigs were inoculated intracerebrally with each sample. One sample produced temperature reactions in both g. pigs inoculated, and three weeks later these animals were immune to inoculation with Western type virus. Two other g. pigs injected with the same material died, but animals injected with material from the brains of these animals did not develop symptoms, nor did they develop immunity to a subsequent test inoculation. Although the virus was not isolated it appeared to have been present in sufficient quantity to immunize two g. pigs against a heavy test inoculation.

ANON. (1940). **Western Type Equine Encephalomyelitis Vaccine (Chick).**—*Canad. J. comp. Med.* **4.** 31.

E.E. chick vaccine may retain its potency unimpaired for as long as a year at 34°–40°F., but may be worthless after three months at room temperature. Purchasers should therefore satisfy themselves that the requirements for preservation have been carried out. Such vaccines, whether prepared in Canada or elsewhere, can only be sold if approved by the Veterinary Director General after potency, avirulence, and bacterial sterility tests have been made at the Animal Diseases Research Institute, but these precautions are largely nullified if vaccines are improperly stored.

—R. GWATKIN.

PIRES, A., JUSTO, L. F. A., CUCULLU, N. L., MOSTO, D., & POLAK, M. (1939). Consideraciones generales sobre la vacunación contra la encefalomielitis infecciosa de los yeguarizos (vacuna embrión de pollo) y estudio anatomopatológico de las membranas corioalantoides. [**Vaccination against Equine Encephalomyelitis by Fowl Embryo Virus and a Study of the Lesions on the Chorio-Allantoic Membrane**].—*Rev. Med. vet., B. Aires.* **21.** 451–476.

The preparation of vaccines from virus grown on the chorio-allantoic membrane of chick embryos is described. The virus used for the culture was infective to g. pigs at a dilution of 1 : 50,000. After cultivation it was infective to g. pigs at a dilution of 1 : 10,000,000 (for virus from the chorio-allantoic membrane) and at 1 : 1,000,000,000 (for virus from the embryo and amnion). Greater dilutions were not tested. Vaccines prepared from this virus proved to have high antigenic qualities when tested on g. pigs. A later report will be made of tests on horses.

The lesions produced in the chorio-allantoic membrane are described as a thickening of the membranes which are opalescent in parts and haemorrhagic in others. The embryo is withdrawn from the surface and is diffusely haemorrhagic. Microscopically all three embryonic layers are attacked, but the ectoderm shows most abnormality. It shows some cellular proliferation, many of the cells being vacuolated. In this layer also are found large numbers of small granular bodies which stain with haematoxylin and are found both intracellular and intercellular in position. The mesoderm and endoderm both show proliferative changes and the cells are vacuolated. There is considerable hyperaemia.—MILLER WATSON.

OLITSKY, P. K., & MORGAN, I. M. (1939). **Studies on Active and Passive Immunity Resulting from Inoculations of Formolized Inactivated and of Active Virus of Equine Encephalomyelitis.**—*J. Amer. vet. med. Ass.* **95.** 530–533.

Previous studies [*V. B.* **10.** 925.] had shown that there was a rather marked difference in the neutralizing capacity of E.E. antiserum to formolized virus and of antiserum to active virus, when the antiserum-virus mixtures were injected into mice by the intraperitoneal route; when injected by the intracerebral route both mixtures showed about the same low degree of neutralizing capacity. The explanation then given was that the difference in the protective capacity was due to a qualitative distinction in the antibodies produced by active and formolized virus. The experiments reported in the present paper, however, indicate that the difference should be considered solely as quantitative. This conclusion was reached as a result of investigation of (a) the titre of neutralizing bodies in the rabbit, immunized by means of formolized vaccine as compared with that produced by active virus, (b) dilution of immune sera, and (c) increasing the number

of courses of vaccination in the g. pig. The experiments also showed that a formolized vaccine was capable of reproducing the antigenicity of active virus.—N. J. Scorgie.

I. Hjärre, A., & Berthelsen, H. (1939). Untersuchungen über das weisse Blutbild bei infektiöser Anämie der Pferdes. [**Leucocyte Picture in Equine Infectious Anaemia**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 259–272. [In German: English, French and Italian summaries].

II. Schermer, S. (1939). Der Wert der Blutuntersuchung bei der ansteckenden Blutarmut der Pferde und die Grenzen ihrer Leistungsfähigkeit. [**Blood Tests in Equine Infectious Anaemia and their Limitations**].—*Berl. Münch. tierärztl. Wschr.* June 23rd. 389–391.

I. The leucocyte picture in naturally occurring and experimental cases of E.I.A. was studied by making cell counts and by examining blood smears at intervals, both by supravital staining with neutral red and by the ordinary Romanowsky stains. Observations were also made on films of sternal bone-marrow taken by means of a special trocar, the technique being described in detail.

The blood picture shows first a rise in neutrophiles, followed by a fall during the period of pyrexia; this is then followed by a rise in monocytes and finally in eosinophiles and lymphocytes. These quantitative changes are accompanied by qualitative changes, especially in the neutrophiles, as indicated by supravital staining with neutral red. There is increased absorption of the dye, vacuolation of the cytoplasm, and evidence of degenerative nuclear changes in the form of pyknosis and karyorrhexis. These changes run parallel to the temperature curve. Occasionally there is a "shift to the left" (Schilling) and immature neutrophiles may appear in small numbers.

The changes observed simultaneously in the bone-marrow are hyperaemia, a decrease in normoblasts and an increase in myeloid cells.

II. This is a summary of the findings in 650 horses suspected of E.I.A. and autopsied at the veterinary institute at Göttingen. A more detailed account is stated to be given in an inaugural dissertation by Hirth [untraced. From Göttingen, probably published 1939.], who worked under the direction of S.

Haematological examination is of very little use in animals which are not showing clinical symptoms; whenever possible the examination should be repeated. The blood picture in certain chronic pathological conditions—anaemia due to parasites, tuberculosis, nephritis, pleuritis, and peritonitis—is sometimes identical with that of E.I.A. It is stressed that haematological and histological examinations should be regarded as methods for assisting the practitioner in making a diagnosis, the clinical history, epidemiology and general P.M. findings, having been carefully considered. In this way the blood picture will enable about 70% of cases to be diagnosed.—E. G. White.

Generoso, J. D., Solis, J. A., & Axibal, V. R. (1940). **Report of the Committee on Hog Cholera [Philippine Veterinary Medical Association].**—*Philipp. J. anim. Indust.* **7.** 140–142.

The losses from swine fever and swine plague notified in 21 provinces of the Philippine Islands during 1939 amounted to 1,715 cases, estimated to be only about 10% of the actual losses which occurred. The figures are a little better than those for 1938, probably because of increased immunization against S.F. So many owners keep only one pig that an extensive application of simultaneous serum and virus treatment is difficult. Investigations into the use of Dorset's crystal-violet vaccine by Topacio [*V. B.* **10.** 513.] are being continued. The disease continues to be widespread in an enzootic form, more fatal epizootics occurring in various localities every two or more years.

A brief review of current S.F. investigations is made, one worker (Zinchis) [reference not traced] showing that sheep may be infected by injection and by co-habitation with infected animals and that the blood of a calf injected with sheep virus may remain infective for pigs for three but not for 14 days after injection.

—C. V. Watkins.

ten Thije, J. H. (1939). De diagnostiek van varkenspest. [**Diagnosis of Swine Fever**]. —*Tijdschr. Diergeneesk.* **66.** 945–954.

In 1937 S.F. was placed under official control in Holland. Prompt diagnosis of the disease is important. It cannot be diagnosed with certainty except by animal inoculation tests, a method difficult to apply extensively. In diagnosis, anatomical-pathological changes are more important than anamnesis and clinical symptoms.

The author describes the lesions observed P.M. There are haemorrhages up to the size

of a farthing on the skin; little round diphtheroid spots or areas of necrotic inflammation on the tongue, the tonsils, and in the mouth; haemorrhages of various sizes on the serous membranes and on the mucous membranes of the intestine, the stomach, the larynx, and the trachea, and fibrinous exudate, spots, ulcers, and necrotic lesions on the folds of the mucous membrane of the stomach.

In the large intestine the haemorrhages are more diffuse; fibrinous enteritis with necrotic processes chiefly localized in the lymphatic tissue, coagulated blood in the lumen, and faeces mixed with blood are observed. These lesions are not superficial and in 80% of cases, after close investigation only 2–3 small characteristic spots can be seen. Haemorrhages causing haematuria are observed on the thickened mucous membrane of the bladder. Kidneys, lungs, spleen, muscles, brain, and brain meninges showed lesions of septicaemia with degeneration. Lymph nodes are swollen and haemorrhagic. Histological examination of the brain reveals encephalitis in 75–85% of the cases. A description is given of several doubtful cases complicated with catarrhal pneumonia, in which examination of the brain gave a positive diagnosis for S.F. [see also *V. B.* **8.** 702]. The lesions of the stomach and the large intestine also enabled a positive diagnosis to be made as well as haemorrhages in the lymph nodes, skin, and bladder (with red urine).

—L. Tobback.

de Gier, C. J. (1939). De intracutane reactie bij varkenpest. **[The Intradermal Test for Swine Fever].**—*Tijdschr. Diergeneesk.* **66.** 1247–1258. [English, French and German summaries].

The author carried out a number of experiments to determine the value of the intradermal test in S.F. Various combinations of S.F.-infected blood or organ suspension ± castor oil ± formalin were injected into immune pigs; control experiments were carried out with similar material from uninfected animals. The results given in terms of increase in skin thickness are shown graphically. They indicate a poor degree of specificity or reliability for the test, as substantial increases of skin thickness occurred in most cases, yet in one case only was the increase threefold (the criterion laid down by Donatien & Lestoquard), with serum from a pig clinically affected with S.F. The impression is obtained that value can only be attached to the positive reaction, a negative reaction being no proof of the absence of infection.—L. Tobback.

Schang, P. J., & Rottgardt, A. (1938). Estudio del virus de peste porcina desecado. **[Studies on Desiccated Swine Fever Virus].**—*Rev. Med. vet., B. Aires.* **20.** 185–199.

The authors carried out a number of experiments with vacuum-dried S.F. virus stored in a refrigerator, and report that virus so treated retains its virulence for 37 months at least. It also retains its antigenic power for at least 28 months. Virus dried in an oven at 37°C. loses its virulence and also its antigenic qualities very quickly.—Miller Watson.

Jansen, J. (1939). Over de gevoeligheid voor het varkenspest virus. **[Susceptibility of Animals to Swine Fever].**—*Tijdschr. Diergeneesk.* **66.** 955–957.

J. reviews the literature and describes his experimental attempts to infect g. pigs, mice, ferrets, a pigeon, a fowl, and a rat with S.F. virus of high virulence, injections being intracerebral or intratesticular. All the tests had a negative result and virus could not be recovered from these animals. A pig infected from the same lot of virus died of S.F.—J. E.

Hupbauer, A. (1941). Zarazna uzetost svinja. (Tješincka bolest.—Meningo-encephalomyelitis son purulenta enzootica suum). **[Porcine Encephalomyelitis].**—*Jugoslov. vet. Glasn.* **21.** 55–61. [Abst. from German summary].

This is the first report of porcine encephalomyelitis in Jugoslavia, where it occurred in the autumn of 1940 in the north. Diagnosis was confirmed at the Zagreb veterinary school. The disease is described.

Eaton, M. T. (1940). **Transmission of Epidemic Influenza Virus in Mice by Contact.**—*J. Bact.* **39.** 229–241.

E. reports the results of experiments in which many groups of normal mice became moderately or grossly diseased with influenza virus by contact with mice infected with human or porcine strains. Less regularly infection could also be set up by ingestion.

Inapparent infection was tested in all contact mice by at least two intranasal passages of lung tissue through fresh mice. No consistent multiple passage of the virus was possible unless intranasal passages were interposed, and even

then the virus sometimes died out after a few passages. About two out of every hundred contact mice studied died before this period, showing almost complete lung consolidation. Three human (PR8, WS, and Melbourne) and a swine strain of virus were tested. The number of mice infected bore some relationship to the period of adaptation of each virus to mice. E. shows that the degree of infection of contact mice is related to the concentration of virus given to the inoculated mice. The actual time of contact after infection and the period of contact are other important factors. In these experiments the mice were intentionally overcrowded. E. considers that either droplet infection or direct nasal contact was the probable means of transmission. External application of virus suspension to the fur of 26 mice did not set up infection.—C. V. W.

DALE, C. N., & DOLLAHITE, J. W. (1939). **Experimental Transmission of Equine Influenza.**—*J. Amer. vet. med. Ass.* **95.** 534–535.

Pooled sera from three horses affected with typical equine influenza were filtered through a Berkefeld N candle and inoculated subcutaneously into two normal horses. After incubation periods of four days in one animal and five in the other, there was a febrile reaction followed by nasal discharge and other clinical symptoms of influenza. A normal horse, placed in contact six days after the inoculation of the first two animals, developed a mild attack commencing on the sixth day.

Data are given on the sedimentation rate and volume of red blood cells in the affected horses. —R. E. GLOVER.

ULČ, F. (1939). O chřipce u hřibat. **[Influenza in Foals].**—*Zvěrolék. Obz.* **32.** 185–191. [Abst. from German summary].

An unusual type of influenza occurs every year in July in foals of the same year at the Neuhof stud at Pisek. There is high fever and icterus, and respiratory or intestinal complications usually follow, often with a fatal termination.

The exact aetiology of the primary and secondary disease has not been established.

WHITNEY, L. F. (1941). **"Canine Influenza".** —*Vet. Med.* **36.** 216–219.

W. describes a disease of dogs bearing a close similarity to distemper but having the following distinguishing features. The temperature was higher than in distemper, the duration of the disease was only about a week, and convalescence was fairly rapid, unless pneumonia or enteritis followed as complications. An attack of the disease did not protect against distemper, but vaccination against distemper or recovery from an attack of distemper, protected fully against this disease. Since the condition often occurred concurrently with human influenza, it is suggested that it may have an aetiological relationship with that disease and that transmission may occur from dog to man and *vice versa*.—N. J. SCORGIE.

WATSON, E. A. (1939). **The Use and Possible Effects of Live Virus Vaccine as a Means of Preventing Distemper on Fox and Mink Farms.**—*Circ. Dep. Agric. Can.* No. 143. pp. 4.

A systematic account is given of distemper infection amongst fur farm animals with reference to spread, predisposing factors, and variation in severity. Virus-vaccine, modified by 50–80 ferret passages so as to possess an increased " fixed " virulence for ferrets, was administered to experimental groups of healthy fox and dog puppies bred and maintained in quarantine compounds. All the animals in some groups survived vaccination and later proved immune to distemper, but one or several deaths resulted from vaccination in other groups. Mortality from vaccination with " ferret-passage virus " was found to reach 50% in minks and 10–20% in foxes and dogs. The epidemiology of distemper on fur farms is described with a summary of preventive measures. Distinction is made between the use of anti-distemper vaccine and serum, and results of virus-vaccine and serum-virus-vaccine treatment are compared. Virus vaccination is recommended only as an emergency measure to reduce or prevent loss on a fur farm where distemper has been proved to exist.—R. O. MUIR.

I. GREEN, R. G., CARLSON, W. E., & SWALE, F. S. (1940). **Vaccination of Dogs with a Modified Distemper Virus.**—*Vet. Med.* **35.** 302–304.

II. WHITNEY, L. F. (1940). **Permanent Distemper Immunization by Vaccine Alone.**—*Ibid.* 408–414.

I. This is a report based upon the prophylactic vaccination, by veterinary practitioners, of 419 dogs ranging in age from twelve weeks to five years. A modified dog distemper virus,

which had been passaged through ferrets 53 times, was employed; a single subcutaneous dose was given in all cases. There were four deaths, but the results otherwise were uniformly good. Some animals were subsequently injected with virulent distemper virus, but remained resistant, as did those exposed to natural cases of the disease.

The usual precautions must be taken with regard to the condition of the vaccinated animal, in which a mild reaction is usually provoked about 5–7 days after the injection. Hyperimmune serum partially or completely nullifies the modified virus vaccine, and an interval of at least 16 days should be allowed to elapse between any dose of serum which may have been given and vaccination. As some practitioners attempt to convey a passive immunity to young puppies by the use of such serum, this is an important practical point.

II. It is alleged that the results obtained with the vaccine-virus method of immunization (LAIDLAW & DUNKIN, method I) have given very variable results in practice. W. considers that the virus which is available commercially is, due to the time and conditions of transport, often dead at the time of inoculation. Details of experiments carried out at the Yale University Medical School and elsewhere are given; of a total of 35 samples of commercial virus examined, 27 were found to be inactive. Other failures are attributed to the use of vaccine which is old or of low potency.

W. considers that it is possible to confer a solid immunity on dogs by the use of sufficiently large doses of a formolized vaccine which has been freshly-prepared from the spleen of an animal at the height of infection. Thirty-one puppies, of several different breeds, were so treated, and six months later they were exposed to natural infection; four puppies only developed the disease, and all recovered. Mortality among untreated controls and among puppies treated with an older vaccine of the same type was high, although it appeared that the use of the older vaccine conferred some degree of immunity. It is stated that LEBAILLY, in 1927, was the first to employ this type of tissue-vaccine-alone immunization.—A. N. W.

HELLESNES, P. (1940). Hvalpesyke hos pelsdyr. **[Distemper in Fur Animals].**—*Beretn. 5. nord. Vet.-møde, Kbh., 1939.* pp. 989–1001. [In Danish]. [English summary amended].

An account is given of the form of distemper in silver foxes which has appeared in Norway in recent years and which has played a very important economic role. The description is based on experiments carried out at the State Veterinary Clinic in Oslo during the years 1936–1938 and on observations made in practice.

The disease has an incubation period of about three weeks (18–24 days). There are catarrhal and nervous symptoms. The mortality is high among the animals which show distinct symptoms, being up to 100% among the young cubs on one farm. The older cubs (about six months old) are more resistant, while adult foxes as a rule only exceptionally show other symptoms than slight feverishness and bad appetite for a few days, and for that reason are dangerous carriers of infection.

The virus is pathogenic for foxes and polecats, but not for dogs. The canine virus ("Wellcome virus") on direct inoculation into foxes produces a rise in temperature after 3–7 days, but no other symptoms, and it affords no protection against subsequent infection by vulpine virus. Dogs inoculated with the vulpine virus show no symptoms, not even the slightest rise in temperature. On being afterwards infected by canine virus ("Wellcome virus"), the dogs show the ordinary symptoms after the usual incubation period. Polecats are highly susceptible to vulpine virus, which has the same incubation period as the canine virus and with which there are similar symptoms. These results accord with those obtained by WATSON, PLUMMER and WEST in Canada.

It seems that the virus can be detected in the blood only during the period of fever; it was not found possible to convey the disease by inoculation with material from a fox or polecat which had died of distemper; neither did extracts from the spleen or other organs produce any reaction.

Salmonella infection (paratyphoid) is a very usual secondary infection in fox distemper. It is probable that, when paratyphoid occurs apparently in an enzootic form on a fox farm, it is a question of primary infection with the virus.

Feeding of foxes with virulent salmonella bacteria produced no symptoms, but when they were later inoculated with the distemper virus they became ill and died of "paratyphoid" after the ordinary incubation time for distemper.

German distemper serum (Staupe Immunserum, Behring) had an excellent effect when used in simultaneous inoculation in the smaller fox farms; but on the larger fox farms the results were less satisfactory. The problem of its dosage has not yet been solved. In a malignant outbreak of distemper on a large fox farm, English distemper serum, used prophylactically, seemed to check the epizootic, after German virus serum had been employed without success. It is possible that several variants of the virus, differing in immunizing properties, exist in Norway.

LUCAS, A. M. (1940). **The Cytology of Fox Encephalitis and the Effects of Centrifugation upon the Intranuclear Inclusions.**—*Amer. J. Path.* **16.** 739–760.

The effect of the virus of fox encephalitis on the nuclei of reacting cells was studied by means of the Beam's ultracentrifuge. Two distinct changes took place in cells which developed intranuclear inclusions, one being the reaction induced by the presence of the inclusions, and the other accompanying the necrosis of the cells. These two stages must be recognized before the sequence of inclusion development can be accurately followed. In general, centrifugation of inclusion-bearing cells showed that the basichromatin was the heaviest substance in the nucleus: the inclusion body came to rest against it. The inclusion itself was composed of two parts, *viz*, the basophilic centre and the mantle of oxychromatin; these tended to separate under the influence of high speed centrifugation.

The inclusions of fox encephalitis are examples of type B [see also COWDRY.—*V. B.* **6.** 708]. The use of the centrifuge in the identification of oxychromatin and basichromatin is discussed.—R. E. GLOVER.

TORRES, S. (1941). **Infectious Feline Gastro-enteritis in Wild Cats.**—*N. Amer. Vet.* **22.** 297–298.

Using virus-infected material (blood, spleen, liver) obtained during an outbreak of infectious feline gastro-enteritis amongst wild cats in a zoo, T. demonstrated that the disease was transmissible to domestic cats. Cross-immunity tests with three viruses from other outbreaks in Brazil showed that the viruses were identical. Further experiments carried out by T. showed that fleas infesting cats harbour the virus and play an important part in the spread of the disease.—N. J. SCORGIE.

KLIGLER, I. J., & BERNKOPF, H. (1941). **Studies on the Cultivation and Antigenic Characters of Rabies Virus.**—*Amer. J. Hyg.* Sect. B. **33.** 1–8.

Experiments were carried out on the cultural requirements of fixed rabies virus, the virulence of culture virus, and the antigenic properties of culture virus. For successful culture mouse- or rat-embryo brain and human or monkey serum are required. The virus has been carried through 20 serial passages in the developing chick embryo. Propagation is only possible in embryos 5–6 days old. Culture virus rapidly loses its capacity to infect mice by the intraperitoneal route. Both active and formolized culture virus constitute potent antigens; the use of active virus is accompanied by a degree of risk. This risk is apparently completely eliminated in mice by a single previous injection of formolized virus. The addition of brain tissue to a culture or a vaccine in a concentration of 15% seems to impair antigenic potency. —S. J. GILBERT.

REMLINGER, P., & BAILLY, J. (1940). Influence de la vapeur d'eau sur l'activité des poudres de virus rabique. [**The Effect of Water Vapour on the Activity of Dried Rabies Virus**].—*C. R. Acad. Sci., Paris.* **210.** 683–684.

Virulent rabbit-brain tissue was dried rapidly *in vacuo*, kept for a time in a desiccator and then divided into two lots, one being sealed without delay in ampoules and the other being placed in small open tubes which were then enclosed in sealed ampoules containing a little quick lime.

On testing for virulence at intervals, it was found that the first lot of tissue remained virulent for months, whilst the other lot began to lose virulence after some weeks [exact times not stated]. It is concluded that this loss of virulence was due to spontaneous proteolysis, which was enabled to take place by reason of the presence of minute traces of water vapour in the small open tubes into which the tissue was put.—J. E.

I. CASALS, J. (1940). **Influence of Age Factors on Susceptibility of Mice to Rabies Virus.**—*J. exp. Med.* **72.** 445–451. [Author's conclusions copied *verbatim*].

II. CASALS, J. (1940). **Influence of Age Factors on Immunizability of Mice to Rabies Virus.**—*Ibid.* 453-461. [Author's conclusions copied *verbatim*].

III. Johnson, H. N., & Leach, C. N. (1940). **Comparative Susceptibility of Different Strains of Mice to Rabies Virus.**—*Amer. J. Hyg.* Sect. B. **32.** 38–45. [Authors' summary copied *verbatim*].

I. (1) 7 to 9 day old mice are more susceptible than older mice to injections of fixed or street virus by any route. (2) 20 day old mice are more susceptible than 60 day old mice to peripheral but not intracerebral injection of fixed virus. (3) 20 day and 60 day old mice are equally susceptible to street virus.

II. (1) W-Swiss mice 60 or more days old are more readily immunizable against rabies virus infection than 20 day old or younger mice; this difference in immunizability with increasing age is most conspicuous when vaccination with virulent virus is followed by intracerebral test infection and least apparent when vaccination with avirulent virus is followed by intramuscular test infection. (2) The titre of circulating neutralizing antibodies does not parallel the titre of immunity.

III. (1) White mice from ten different breeding establishments, in addition to a strain of laboratory-bred brown mice and a species of field mice, were tested for their comparative susceptibility to rabies virus.

(2) Two strains of rabies virus were used. One of these was of human origin and had been passed five times in mice by intracerebral inoculation. The other was from a dog with furious rabies, and it was used directly from the original source without preliminary animal passage.

(3) No essential difference in their susceptibility to the two different strains of virus used was apparent in the various types of mice. The "Dilute Brown" and the field mice seemed slightly less susceptible to higher dilutions of virus than the white mice; but with more concentrated dilutions the mortality rate, length of incubation period, and the duration of the experimental disease was practically the same in all mice tested. There was a difference of about 2 days between the average lengths of the incubation periods of the two strains of virus tested.

(4) On the basis of the study here reported it is concluded that most white mice obtainable from commercial dealers are equally satisfactory animals for the diagnosis of rabies by intracerebral inoculation of suspicious material.

Lyon, B. M., Reddin, L. Jr., & Woodman, R. (1940). **Demonstration of Rabies Virus Neutralizing Antibodies in Dogs Following Vaccination.**—*Vet. Med.* **35.** 310–311.

Twenty-four dogs were divided into three groups and four animals in each group were inoculated with phenol-killed vaccine and four with chloroform-killed vaccine. Group 1 received one dose (0·5 c.c.), group 2 two doses, and group 3 three doses at weekly intervals. One month after the first dose of vaccine the dogs were bled and neutralization tests were performed by adding 0·3 c.c. of serum to an equal quantity of 10^{-5} dilution of rabies street virus and keeping the mixture at 4°C. for one hour. Each mixture was injected intracerebrally into six mice in doses of 0·03 c.c. Viricidal antibodies were shown to be present in the vaccinated dogs. An occasional poor neutralization may have been due to the emaciated condition of the dogs, of which a number died during the experiment.—S. J. G.

Rosenfeld, I., & McDaniels, H. E. (1939). **Heterophile Antibodies Developed During Prophylactic Rabies Immunization.**—*Proc. Soc. exp. Biol., N.Y.* **42.** 640–643.

The blood sera of human patients who had undergone Pasteur rabies treatment were found to contain agglutinins for the red blood corpuscles of the g. pig, rabbit, and sheep. Determination of the agglutinating titres for sheep r.b.c., before and after absorption with g. pig and rabbit kidney, ox r.b.c., and kaolin, showed that, although the antibodies produced were of the heterophilic type, they did not belong to the special Forssmann group.

—R. O. Muir.

Webster, L. T. (1941). **Antirabic Vaccination—Present Status.**—*Amer. J. publ. Hlth.* **31.** 57–59.

A valuable commentary-review of the latest advances in research in the U.S.A. on rabies vaccines. Now that there is a reliable potency test, using mice and dogs [see *V. B.* **10.** 26, and **11.** 225], a notable advance has been made. Work has been done on the selection of virus strains for making vaccine, and on the best source of vaccine material. Mouse-brain culture virus has been found valuable for immunization by intraperitoneal injection, and chick-embryo allantoic membrane virus and chick-embryo brain virus have been used with

some success in rabbits, but with less success in mice and dogs. There is objection to the mass use of these live vaccines, so W. has worked on the production of a dead vaccine, by treating culture virus with ultra-violet rays. It was found that 1 c.c. of such vaccine gave good protection to mice and that the corresponding dose on a weight basis for dogs was 500 c.c., this being too large for practical purposes. Even after desiccation to one tenth, the required dose of 50 c.c. was inconveniently large. The latest experiment undertaken was to test the value of the supernatant fluid from centrifuged, irradiated, mouse-brain virus. The final result is not yet available.—J. E.

—. (1940). **Why Pick on Anti-Rabies Vaccine?**—*Vet. Med.* **35.** 208–210.

In view of much opposition to the vaccination of dogs against rabies in the U.S.A., this editorial argues that vaccination is of value and that it materially increases the chances of survival among vaccinated dogs. It is claimed that certain laboratory experiments which set a low value on vaccination [see *V. B.* **10.** 673.] are of limited practical significance.

The writer sums up the situation by saying that " the present attitude of a large proportion of dog owners is such that no measure of control can be fully enforced ". He refers to the case of Indianapolis, where from 1935–39 there was a marked fall in " positive heads " examined (269 to 30) due to compulsory vaccination. Anti-vaccination interests, however, have succeeded in getting the vaccination order repealed.—J. E.

Hodes, H. L., Webster, L. T., & Lavin, G. I. (1940). **The Use of Ultraviolet Light in Preparing a Non-Virulent Antirabies Vaccine.**—*J. exp. Med.* **72.** 437–444.

This paper describes in detail the experiments concerned in a preliminary report, previously published [(1937). *Science.* **86.** 447.], that rabies virus exposed to the rays of a mercury vapour lamp under proper conditions loses virulence but retains considerable immunizing potency for mice. Ultra-violet light has been shown to render avirulent neurotropic viruses including the rabies virus, with accompanying loss of immunizing potency, but it is now shown that with proper exposure virulence may be destroyed and immunizing potency retained. A description is given of the apparatus used. Nine experiments were performed in which the immunizing effect of non-virulent irradiated vaccine was measured by intracerebral inoculation of vaccinated mice with test virus, and four experiments in which the immunizing effect was measured by intramuscular inoculation with 0·01 c.c. of test virus in graded dilutions. The vaccinated mice showed considerably increased resistance to infection.—S. J. Gilbert.

Hoyt, A., & Warner, D. (1940). **Urea-treated Virus as a Vaccine Against Rabies.**—*Proc. Soc. exp. Biol., N.Y.* **43.** 154–156.

The work described indicates that rabies fixed virus mixed with a one-third saturated solution of urea in saline has a low-grade immunizing power in mice (by repeated intraperitoneal injections), a course of eight daily injections protecting against 10 M.L.D. of virus.—J. E.

Kelser, R. A. (1940). **Measures for the Control and Prevention of Rabies.**—*Cornell Vet.* **30.** 321–330.

This is an informative discussion on the rabies problem in the U.S.A. K. comments on the reasons for the lack of effective control [see *V. B.* **11.** 296.] and discusses vaccination with special reference to immunizing potency. He considers that Webster's conclusions [*V. B.* **10.** 673.] do not warrant the assumption that the vaccination of dogs is useless. On the contrary, practical results indicate that a vaccinated dog has a very good chance of resisting natural infection, even with the one-dose method. Nevertheless, K. advocates an increase in the vaccinating dose of the commonly used chloroform vaccine and a course of three injections at weekly intervals.—J. E.

Llibre, M. H. (1939). Profilaxis de la rabia. [**Prevention of Rabies**].—*Rev. Med. trop. parasit., Havana.* **5.** 179–192.

This is a review of the present position in regard to the prophylaxis of rabies in Cuba, which L. considers satisfactory. Measures include the compulsory vaccination of dogs, the collection and destruction of stray dogs, and the observation of suspected animals.—M. W.

Dujarric de la Rivière, R. (1940). Prophylaxie de la rage. [**Prophylaxis of Rabies**].—*Mouvem. sanit.* **17.** 105.

Indications are given, in tabular form, for decisions as to whether or not persons bitten by dogs should undergo rabies vaccination.

Measures to be taken for the control of animals capable of transmitting rabies are also discussed.

GOODPASTURE, E. W., ANDERSON, K. (1940). **Immunity to Fowlpox Studied by Means of Skin Grafts on Chorioallantois of Chick Embryo.**—*Arch. Path.* **30.** 212–225.

The authors attempted to determine whether immunity to virus infection depends chiefly on humoral antibodies, or whether, in addition, the epithelial cells have the power to acquire resistant properties. In a previous article, G. had demonstrated that the skin of both normal and immune fowls could readily be grafted on the chorio-allontois of the chick embryo. All the experiments demonstrated that the epithelial cells from immune chickens have no immunity to fowl pox virus after their removal from the immune host; on the other hand immunity appeared when susceptible skin grafts were reimplanted successfully on the immune host.

The criterion of immunity was the presence of Bollinger bodies in the epithelial cells 96 hours after infection of the graft. Further experiments were carried out with serum, whole blood, plasma, and leucocytes, from immunized chicks. The material was injected intravenously into the chorio-allantoic veins, the chorio-allantoic ectoderm then being inoculated with fowl pox virus. A well developed infection appeared in all cases in which serum was given. Whole blood, plasma, and leucocytes when used in a similar fashion had a modifying effect on the number of pocks developed following skin inoculation.

The authors concluded that these experiments showed that the epithelial cells in themselves were unable to develop any acquired immunity, the immunity being due rather to humoral or local factors in other tissues.

Two plates are included which give an excellent histological picture of both normal and diseased ectoderm.—G. C. BRANDER.

IYER, S. G., & DOBSON, N. (1941). **An Attempt to Breed Fowls Resistant to Newcastle Disease from Immune Hens.** —*Vet. Rec.* **53.** 186–188.

The authors briefly review the literature on the inheritance of disease and genetical resistance to disease. In their experiments they mated two hens, which had resisted a subcutaneous injection of Newcastle disease virus, with a healthy cockerel and reared five chicks. These were tested at one month old and again ten days later with 50 M.L.D. of Newcastle disease virus. One chick died from other causes on the second day after testing, but the other four remained healthy. Eleven control chicks reared from susceptible parent birds all died within the usual period following infection by inoculation or contact. The authors suggest that their limited findings indicate that the disease may be controlled by selective breeding from resistant stock.—C. V. WATKINS.

PENSO, G. (1939). Studi sul virus della malattia dei porcai. **[The Virus of Swineherds' Disease].**—*IV Congr. int. Pat. comp., 1939.* **2.** 155–156. [In Italian].

The pig disease considered to be associated with the incidence of swineherds' disease can be produced experimentally in pigs by injecting them with virus from the human cases. The disease so set up in pigs is sometimes acute, causing death, and sometimes runs a mild course, with recovery. Immunity is demonstrable in recovered animals. P. states that this pig disease is an entity. He considers that it has some resemblance to swine fever, but that cross-immunity tests have shown the two diseases to be distinct.

The virus of S.D. produces pyrexia without evidence of clinical illness in rats, rabbits, and sheep. Cats and dogs are not susceptible. The virus is filtrable and cannot be grown on ordinary culture media. It does not live long in the laboratory.

In this disease of pigs there is a typical syndrome. The affection begins with mild intestinal disturbances and a slight rise of temperature and this is followed by typical phenomena of excitement which may develop into epileptiform attacks with trismus, rigidity of the neck, and occasional twisting of the head towards one side with circling movements in one direction and salivation.

The lesions in swine dead from this disease are punctiform haemorrhages in the intestine, in the renal pelvis, in the larynx and in the brain. Histologically there are small intestinal ulcers with haemorrhages and leucocytic infiltration rich in eosinophiles. There are perivascular infiltrations in the liver. In the glomeruli of the kidney there is an endothelial reaction and there are small haemorrhages in the renal tubules. The lung tissue is indurated and peribronchial leucocytic infiltration occurs with slight haemorrhage. Haemorrhages are

also present in the lymph nodes, eosinophiles abounding.

BURNET, F. M., & LUSH, D. (1940). **The Action of Certain Surface-Active Agents on Viruses.**—*Aust. J. exp. Biol. med. Sci.* **18.** 141–150.

In a previous paper it was reported that there was a close correspondence between the different susceptibility of various viruses to a virus-inactivating agent (V.I.A.) from human nasal secretion and to sodium desoxycholate. It has now been found that sodium lauryl sulphate and saponin also have a selective inactivating effect on certain viruses. Saponin solution shows a particularly sharp differentiation of viruses into those susceptible and those insusceptible to its action.

The action of all three chemical agents is modified by the presence of protein in the suspending fluid and by the concentration of virus present. There are gross deviations from the " percentage law " of Elford and Andrewes. Psittacosis virus is almost unaffected by these surface-acting chemicals, and a method is suggested for its isolation from sputum containing mouse-pathogenic pneumococci by treatment with sodium lauryl sulphate.

All the bacteriophages tested are highly resistant to these agents. Viruses can be arranged in a series of graded susceptibility which, with insignificant exceptions, is the same for sodium desoxycholate, sodium lauryl sulphate, saponin, the virus inactivating agent in human nasal secretion, and homologous immune serum. The possible significance of this observation is discussed.—W. I. B. B.

ANDREWES, C. H. (1939). **Latent Virus Infections and their Possible Relevance to the Cancer Problem.**—*Proc. R. Soc. Med.* **33.** 75–86.

A. discusses the significance of viruses as possible activators of neoplasms with special reference to latent virus infections which are considered under four main headings. In transient latent infections, which are usually self-limiting, animals become infected without developing overt symptoms: they may subsequently acquire a subclinical immunity, *e.g.*, yellow fever, poliomyelitis, psittacosis, etc. In persistent virus infections the agent may parasitize the body for long periods although no symptoms are seen. Permanent immunity may be dependent on the persistence of small amounts of virus which are frequently masked by corresponding antibodies, *e.g.*, in foot and mouth disease, fowl pox, lymphocytic choriomeningitis, etc. Indigenous virus infections, which are often symptomless and persistent, commonly infect their host in early life and may even be handed down from parent to offspring, *e.g.* rickettsia-like bodies in certain insects, bacteriophages, and some plant viruses. Swine influenza is a typical example of complicated latent infection since the virus, as suggested by SHOPE [*V. B.* 10. 761.], may pass through intermediate invertebrate hosts where it may undergo such modification that it will only set up the disease again when stimulated by some other agent (*Haemophilus influenzae suis*).

If these suppositions regarding latency are accepted and are coupled with observations which have been made on tar sarcomas of fowls, neurolymphomatosis of poultry, etc., it can be agreed that certain malignant conditions are induced by the action of a tumour virus imprisoned within the cells and acting as a latent infection which can be liberated by the operation of a second agent, *e.g.*, tar.

A new concept is also introduced, termed " toothless viruses ". These are regarded as agents which cannot be demonstrated directly by injection into fresh hosts, but only by indirect means such as their power of producing antibodies. It is suggested that this modification of viruses is of the nature of a disuse atrophy whereby viruses can be carried from cell to cell during division without adversely affecting the latter.—R. E. GLOVER.

PARASITES IN RELATION TO DISEASE [GENERAL]

MADSEN, H. (1941). **The Occurrence of Helminths and Coccidia in Partridges and Pheasants in Denmark.**—*J. Parasit.* **27.** 29–34.

A survey was made of the parasitic fauna in 143 partridges and 56 partridge chicks and in 169 pheasants and 67 pheasant chicks, obtained from various localities. The following parasites were found :– *Prosthorhynchus transversus*, *Raillietina echinobothrida*, echinostomes (probably *Echinostoma revolutum*), *Syngamus trachea*, *Acuaria* (*Dispharynx*) *spiralis*, *Capillaria con-*

torta, *C. longicollis*, *C. columbae*, *C. collaris*, *Ascaridia compar*, *Heterakis gallinae*, *Trichostrongylus tenuis*, and seven unnamed species of coccidia. Of these, *E. revolutum* and *C. collaris* are apparently recorded for the first time from pheasants, and *A. spiralis* and *C. columbae* have not hitherto been recorded from European partridges.—M. L. Bingham.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

—. (1940). **The Prevention and Treatment of Blowfly Strike in Sheep. Report No. 2. by the Joint Blowfly Committee.**—*Pamph. Coun. sci. industr. Res. Aust.* No. 98. pp. 45.

This pamphlet has been prepared as a comprehensive but succinct review of the various methods available to combat blowfly strike in sheep. It contains little or no original material, but summarizes the practical results of the intensive research in this field and should be of interest not only to stockmen.

In the section entitled " Measures to reduce inherent predisposition " are discussed selection and breeding, Mules' operation and tail-docking. In connexion with the latter it has been found that sheep with very short tails may be struck on the crutch twice as often as sheep with relatively long tails. It is recommended that tails be docked at a length of about four inches.

In the section entitled " Measures to reduce immediate susceptibility " are discussed shearing and crutching, jetting, breech-dipping, protection of rams' heads, general prevention of sepsis and marking of lambs. The latest equipment and technique of jetting are fully described. As many as 300 ewes per hour can be treated by three men. For prevention of strike in lamb-marking wounds the lambs should be marked as early as possible, short docking should be avoided, cleanliness should be regularly enforced, and a repellent dressing of oil of citronella may be applied. The time-honoured dressings containing much tar are to be avoided owing to their blistering action.

In discussing " Measures to reduce fly abundance ", some interesting data are given. After pointing out that very few or even no primary flies breed from a sheep's carcass, it is stated that several thousand may breed from a strike on the living animal. Therefore, prevention of strike is the most important thing in reducing primary fly abundance. The common practice of allowing the maggots in a struck sheep to escape when dressing it, is therefore condemned. They should be killed by poisoning, burning, or scalding, but the practical difficulties sometimes involved are admitted.

Dressings for fly-strike are briefly dealt with and stress is laid on the value of boracic acid.
—W. I. B. Beveridge.

Hindmarsh, W. L., & Belschner, H. G. (1940). **Blowfly Strike of Sheep. Blue Colouration of the Breech. Trials Disprove Repellent Properties.**—*Agric. Gaz. N.S.W.* **51.** 185–187.

A considerable amount of publicity had been given in the popular press to a claim that blowfly strike could be prevented by colouring the susceptible area blue. The authors carried out two trials which showed that the blueing treatment conferred no protection. A trial carried out by the Council for Scientific and Industrial Research also showed that no benefit was conferred by the treatment with blue material. A group was also treated by swabbing the crutch with glycerin diborate, and this group developed appreciably less strikes than the control group.
—W. I. B. Beveridge.

Schroeder, H. O. (1940). **Habits of the Larvae of *Gasterophilus nasalis* (L.) in the Mouth of the Horse.**—*J. econ. Ent.* **33.** 382–384.

The newly hatched larva of *G. nasalis* migrates over the skin surface, from the point of attachment of the egg in the intermaxillary region, to and into the mouth. Its subsequent history, until the appearance of the second instar larva in the duodenum, was previously unknown. S. placed newly hatched larvae on the lips of horses, which were killed at varying times after infestation. Both first and second instar larvae were recovered from the spaces between the teeth, and no other tissue except the gums was found to have been invaded. The second instar larvae varied in size, suggesting that some growth of this stage occurs in the mouth before migration to the duodenum takes place. The duration of the first stage appears to be 18–24 days.—J. MacLeod.

MELVIN, R., & BUSHLAND, R. C. (1940). **The Nutritional Requirements of Screwworm Larvae.**—*J. econ. Ent.* **33.** 850–852.

A method is described of rearing larvae of *Cochliomyia americana*, which in nature infests only living warm-blooded animals, on formolized lean beef and citrated blood. The authors report also successful development of larvae, under laboratory conditions, in garden toads. —J. MACLEOD.

TRAVIS, B. V., KNIPLING, E. F., & BRODY, A. L. (1940). **Lateral Migration and Depth of Pupation of the Larvae of the Primary Screwworm *Cochliomyia americana* C. and P.**—*J. econ. Ent.* **33.** 847–850.

Larvae of *C. americana*, migrating from infested carcasses on to a sandy loam pasture, were found to pupate mostly within an area 8 ft. in diameter. The majority pupated actually under the carcass. A similarly limited dispersion was found when larvae were allowed to drop from an infested live animal. Tests in various types of pasture showed that under natural conditions the larvae almost invariably pupated in the top inch of the soil.

The authors conclude that treatment of the soil near carcasses for destruction of larvae is a practicable control measure.—J. MACLEOD.

TREMBLEY, H. L., & BISHOPP, F. C. (1940). **Distribution and Hosts of some Fleas of Economic Importance.**—*J. econ. Ent.* **33.** 701–703.

This article lists the records of occurrence and distribution in the U.S.A. of the fleas of the cat, dog, rat, chicken, and man, based principally on the record files of the Division of Insects Affecting Man and Animals, of the Bureau of Entomology and Plant Quarantine. The different hosts from which each species has been recovered are also given.—J. M.

JOYEUX, Ch., & SAUTET, J. (1939). Le pou du chien : *Linognathus setosus* (Olfer, 1816) peut éventuellement piquer l'homme. Rôle vecteur éventuel de cet insecte. **[Ability of the Dog Louse to Bite Man ; its Possible Role as a Disease Vector].** —*Arch. Méd. gén. colon.* **8.** 73–76.

It is suggested that *L. setosus* may be capable of transmitting leishmaniasis to man. The authors have shown [*V. B.* **9.** 235.] that lice fed on infected dogs harbour leishmanial and herpetomonal forms of the parasite.

Three trials were made with *L. setosus* collected from dogs. In two of these tests both adults and larvae bit and fed on the human subject. In the third case, the lice died without feeding ; they had been collected from an experimentally infested dog, probably an unfavourable host, and may have been too weak to feed.

It was found that, as leishmanial dermatitis increases in the dog, the lice seek another host. If *L. setosus* does indeed transmit leishmanial infection by biting, the dog is more infective during the early stages of the disease than later, when the skin becomes more furfuraceous.

I. CHANDLER, W. L., & RUHE, D. S. (1940). ***Pneumonyssus caninum* n.sp., a Mite from the Frontal Sinus of the Dog.**—*J. Parasit.* **26.** 59–67.

II. MONLUX, W. S. (1940). **Mites in Nasal Passages and Sinuses of Dogs.**—*Cornell Vet.* **30.** 252–255.

I. A number of mites were found in the frontal sinuses of a Boston bulldog, which had been destroyed as a result of nephritis and prostatitis. At no time had any symptoms of nasal irritation been noticed. A description is given of the adult female and larval mite. These mites are related to the genus *Halarachne*, and bear a close morphological similarity to *P. stammeri*, recorded from a South American monkey.

II. M. briefly records that, on three occasions, mites have been accidentally found in the sinuses and nasal passages of dogs, during the process of removing the brain at autopsy. Reference is made to *Pneumonyssus caninum* n.sp., described in I.—M. L. BINGHAM.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

PETERS, B. G., & LEIPER, J. W. G. (1940). **Variation in Dilution-Counts of Helminth Eggs.**—*J. Helminth.* **18.** 117–142.

A set of egg-counts in faeces, using Stoll's dilution technique and involving 11 series of 25 counts each (with a different mean for each series), was found to be distributed approximately as a Poisson series. The distribution, although not normal in form, showed no significant departure from the corresponding normal curve. With this technique and with

means up to about 15, the variance was considered to be numerically equal to the mean; it was greater than the mean when the latter exceeded this figure. The variation between counts from the same suspension of eggs was significantly less than the variations in count from day to day or in different portions of the same faeces. The daily variation was found to be partly a factor working independently in each animal and partly an overriding factor affecting animals together. This variation was significant on most days and the conclusion was not affected by expressing egg-counts on a faecal dry matter basis. The variations between portions of the same sample of faeces were significant on only one day in four, and this conclusion again was not affected by referring the counts to the faecal dry matter basis.

In a series of 192 counts, two techniques were compared :– (a) suspension of the eggs in water and counting the eggs in 0·15 c.c. portions measured in a McDonald pipette, and (b) suspension of the eggs in half saturated salt solution and counting the eggs in 0·15 c.c. in a McMaster counting slide. The latter technique gave less variable and significantly higher counts as well as being three times as rapid. It was not possible to decide which was the more accurate method as compared with counts of eggs concentrated by sugar flotation.

The authors use their results to emphasize that in experiments involving dilution counts it is essential to consider the problem of variation and its significance, and to arrange the design of the experiments and their analysis so that all extraneous sources of variation are excluded from the error variance.—A. Eden.

Griffiths, H. J. (1939). **Observations on the Bionomics of Ova and Miracidia of *Fasciola hepatica* Linn. in Eastern Canada.**—*Canad. J. Res.* Sect. D. **17.** 205–211.

G. has found that the ova of *F. hepatica* hatch in 13–15 days at 20°C. They can live for at least 16 months at 2°–4°C., hatching subsequently after about 24–30 days at about 20°C. Fully embryonated ova will hatch after 14 months at 2°–4°C., but the miracidia are abnormal. Eggs usually hatch in the morning, and the method of hatching is described. They will attack many species of snails, whether suitable intermediate hosts or not.

—T. W. M. Cameron.

Hsü, H. F., & Hoeppli, R. (1940). **Histological Changes caused by *Metorchis orientalis* in the Bile Duct System of Experimentally Infected Ducks.**—*Chin. med. J.* Suppl. No. 3. pp. 228–234. [In English].

Encysted cercariae of *M. orientalis* occur in the flesh and skin of the fresh-water fish, *Pseudoasbora parva*. Two ducklings were each infected with 885 cysts and killed after 43 days, when the wall of the gall bladder was thickened, largely by hyperplasia of muscle, and the epithelium showed villous proliferations, with increase in the number of goblet cells; beneath the epithelium were accumulations of lymphoid cells, in some places in follicle-like aggregations, larger than those normally present. The larger bile ducts also showed proliferated epithelium, with an increase of periportal connective tissue, and new formation of small bile ducts.—E. C.

Christiansen, M. (1939). Cestoden bei Säugetierwild, ihre Bedeutung und Bekämpfung. **[Importance and Control of Cestodes in Wild Animals].**—*Rep. 13th int. vet. Congr. 1938.* **1.** 623–632. [In German: English, French and Italian summaries. Discussion pp. 642–645 in English, French and German].

Cysticercus pisiformis of rabbits and hares is the commonest cestode of wild mammals; out of 1,000 hares examined in Denmark by C., 26·6% were infested by this parasite. It causes great losses in young hares by predisposing them to *Past. pseudotuberculosis* and *Staphylococcus aureus* infections with resultant fibrinous or purulent hepatitis or perihepatitis. Moreover, laymen often mistake the cyst in the eye for TB., such infested hares being condemned as unfit for food. As dogs can be more easily infested with *C. pisiformis* than are foxes, C. regards the former as the true hosts of this parasite.

C. was unable to prove the identity of *C. cervi* with *C. tarandi* [= *Taenia krabbei*] because he was unable to obtain infested reindeer flesh in a fresh condition.

Control of anoplocephalids in wild mammals is a difficult problem because their life histories are insufficiently known. Their practical importance in wild animals is, however, small.

—A. L. Wilson.

Swales, W. E. (1940). **The Helminth Parasites and Parasitic Diseases of Sheep in Canada. I. A Survey and**

Some Preliminary Studies on Existing Problems.—*Canad. J. Res.* Sect. D. **18.** 29–48.

SWALES, W. E. (1940). **The Helminth Parasites and Parasitic Diseases of Sheep in Canada. II. Notes on the Effect of Winter upon the Free-Living Stages of Nematode Parasites of Sheep on the Pastures in Eastern Canada.**—*Canad. J. comp. Med.* **4.** 155–161.

I. This detailed paper records the results of a seasonal and geographical study of the parasites of sheep in Canada. A list is given of the species found and the technique used is described. While a large variety of species is present, their economic importance varies considerably. In eastern Canada haemonchosis is important in summer, being replaced by trichostrongylosis, oesophagostomiasis, and possibly hookworm disease in late autumn and winter; adult sheep are almost invariably infected with *Oesophagostomum columbianum*. *Ostertagia circumcincta* is not of major importance. In British Columbia, haemonchosis and chabertiasis occur.

II. Owing to the protection afforded by snow, the low air temperatures of winter in Canada have little effect on the living organisms in the soil. They are exposed, however, to almost constant freezing temperatures for a long period. *Haemonchus* and *Oesophagostomum columbianum* cannot resist winter conditions and are carried over only in the hosts to reinfect the pastures each spring. As these two are important pathogens in eastern Canada, control should aim at complete elimination of the parasites from sheep before they return to pasture after winter.—T. W. M. CAMERON.

CAMERON, T. W. M., PARNELL, I. W., & LYSTER, L. L. (1940). **Helminth Parasites of Sledge Dogs in Northern Canada and Newfoundland.**—*Canad. J. Res.* Sect. D. **18.** 325–332.

Hookworms are widely distributed throughout the Canadian arctic, sub-arctic, and Newfoundland, the species being *Uncinaria stenocephala*. Ascarids are equally common, but whipworms and kidney worms are rare. *Diphyllobothrium* spp. are found from the Great Lakes region to the Mackenzie Valley and on the northern coasts. Probably two species occur, the inland species being *D. latum*. The liver fluke, *Metorchis conjunctus*, is found from the St. Lawrence to Saskatchewan, while the intestinal fluke, *Cryptocotyle lingua*, is common on the eastern sea coasts.

SWALES, W. E. (1939). **Notes on the Diagnosis and Treatment of Parasitic Diseases of Sheep in Canada.**—*Canad. J. comp. Med.* **3.** 341–344.

S. points out that clinical disease due to worms is of more common occurrence in Canada in sheep than in any other form of stock. Verminous gastritis due to *Haemonchus* is essentially a disease of lambs in spring. "Black scours" due to *Trichostrongylus* spp. is a disease of young stock in autumn and winter and is often combined with hookworm infection. Nodular disease is primarily found in adult breeding stock, causing serious interference with digestion.—T. W. M. CAMERON.

KAUZAL, G. P. (1940). **Experiments on the Recovery of Sheep Nematode Larvae from Pastures.**—*J. Coun. sci. industr. Res. Aust.* **13.** 95–106.

Following a short resumé of the literature on the subject of isolation of nematode larvae from soil and pastures, a number of experiments are described. A technique which takes advantage of the fact that larvae migrate laterally as well as vertically, proved satisfactory for the recovery of larvae from pasture plots. The Baermann apparatus gave very variable and generally unsatisfactory results. The new technique is fully described and figured.—H. McL. G.

PARNELL, I. W. (1940). **The Comparative Value of Some Further Chemicals in the Treatment of Manure Against Sclerostome Larvae.**—*Canad. J. comp. Med.* **4.** 76–77.

Continuing his work on manure treatment, P. reports on the use of further chemicals. Among those used methyl iodide, iodoform and iodine were very efficient, while phenothiazine was comparatively ineffective in destroying free larvae.—T. W. M. CAMERON.

SWALES, W. E., & FROMAN, D. K. (1939). **An Apparatus for Measuring the "Flash" Thermal Death Point of Microscopic Animal Organisms and its Use with Ova of *Ascaris lumbricoides*.**—*Canad. J. Res.* Sect. D. **17.** 169–177.

The authors describe an ingenious apparatus for the almost instantaneous exposure of small objects to high temperatures. By its use they showed that single-celled ova of pig ascarids were destroyed at 68°C. in 0·44 sec.

—T. W. M. CAMERON.

MILLER, M. J. (1939). **Trichocephalus and Trichocephaliasis.**—*Canad. J. comp. Med.* **3.** 282–287.

M. reviews existing knowledge (including his own experimental observations) on this condition in dogs, discussing bionomics, resistance, pathology, and treatment.—T. W. M. C.

CALZADA, V. (1937). Nuevos nematodes.—Dos nuevas especies del género Capillaria, Zéder. Capillaria montevidensis. —Capillaria uruguayensis. Parasitos de Gallus dom L. [**New Species of *Capillaria* Parasitic in Fowls**—*C. montevidensis* **and** *C. uruguayensis*].—*An. Fac. Vet., Montevideo.* **3.** 73–79.

C. described two new species of *Capillaria* from the large intestine of domestic fowls. Characters distinguishing them from known species are not given.—MILLER WATSON.

ROGERS, W. P. (1939). **A New Species of *Strongyloides* from the Cat.**—*J. Helminth.* **17.** 229–238.

Morphological descriptions are given of the free-living, rhabditiform larvae and adult females and males, the infective filariform larvae, the parasitic larvae in the lungs and the adult parasitic females of *S. cati* n.sp. The nature of the free-living cycle may be summarized as mixed but predominantly indirect; in the parasitic cycle infection may be by mouth or by skin, larvae being found in the host's lungs after four days, young females in the small intestine after six days and the whole cycle, from egg to egg, requiring a minimum of about 14 days. Parasitic males were not found. Although the nematode has been retained as a parasite in the domestic cat it was originally found in the rusty tiger cat, *Felis planiceps*, of the Malay States. In a table, R. gives measurements of the various stages of his new species and of closely allied species [which, however, are not named]. In a concluding discussion R. enumerates several features, besides measurements, in which *S. cati* differs from *S. stercoralis* var. *felis*, *S. fülleborni* and *S. simiae*, and points out that it has features of both the *S. stercoralis* and *S. papillosus* groups. —J. N. OLDHAM.

I. SHELDON, J. H. (1941). **An Outbreak of Trichiniasis in Wolverhampton and District.**—*Lancet.* **240.** 203–205.

II. ANON. (1941). **Trichiniasis in 1922 and 1941.**—*Ibid.* 284–285.

I. S. gives a preliminary account of the clinical course of trichinosis observed in an outbreak during December 1940 in the Wolverhampton area. There was a definite social and sex incidence; the disease was limited to industrial workers and of the 76 cases seen, which included only two children, 62 were female and 14 male. These features are attributed to the habitual practice among the women of eating raw pork sausages spread on bread as a tasty and portable lunch to take to work, or of nibbling half or more of a raw sausage while frying the rest.

II. A comparison is drawn between the outbreak of trichinosis at Milford Haven in 1922, and that at Wolverhampton in December 1940 and at Harpenden in January 1941. The clinical features of both epidemics are similar but not identical. In 1922 sausage was proved to be the source of infection and is likely to be incriminated in the 1941 outbreak. In Milford Haven the 13 infected people ate sausages obtained from a particular butcher; at Wolverhampton and Harpenden the source of the infected pork is still uncertain.—J. N. OLDHAM.

CAMERON, T. W. M. (1939–40). **Investigations on Trichinosis in Canada. II. A Further Survey of the Incidence of *Trichinella spiralis* in Hogs in Eastern Canada. III. On the Incidence of *Trichinella spiralis* in Garbage Fed Hogs.**—*Canad. J. Res.* Sect. D. **17.** 151–153, and **18.** 83–85. [For part I, see *V. B.* **9.** 552].

II. Two thousand unselected hogs were examined for trichinae, and only 15 were found to be positive.

III. It is illegal in Canada to feed pigs uncooked garbage. An examination of 995 unselected garbage-fed hogs revealed only two positive for trichinae.

SEIJFFERS, S. M. (1940). De trichinenbestrijding in de afdeeling bataklanden der residentie, Tapanoeli. [**Trichinosis Control in the Batak Lands, Tapanoeli, Sumatra**].—*Ned.-ind. Bl. Diergeneesk.* **52.** 222–244. [English and French summaries].

The first case of trichinosis in Sumatra was diagnosed in 1929 in a pig at Medan, after which many pigs and dogs were found to be infected. MEIJER and RODENWALDT organized the first campaign against the disease.

S. reports his investigations in pigs and dogs, and shows in four tables the number of animals examined, with their sex and age, and the diminishing percentage of infected pigs from 1930–39 inclusive. The disease was found to be more prevalent in sows.

In order to eradicate trichinosis or, at least, to reduce it to a very low incidence, S. proposes the following measures :– (1) Increase in the number of places where meat inspection of pigs and dogs (also for food) may be carried out, and extension of the area of meat inspection organization. (2) Prohibition of importation of the meat of animals not slaughtered under proper supervision. (3) Closer inspection of slaughtering outside the controlled abattoirs, but avoidance of prohibition to slaughter elsewhere which might increase the number of clandestine slaughterings. (4) Hygienic measures concerning the disposal of meat and the maintenance of abattoirs and butchers' premises. (5) Propaganda amongst the public. (6) Supervision of the movements of pigs and dogs into non-affected areas. (7) Killing of pigs at an earlier age. S. is of the opinion that biological methods of diagnosis are uncertain and not practicable. He advises also the creation of a "mutual insurance" for the distribution of indemnities in cases of trichinosis and cysticercosis.—L. Tobback.

IMMUNITY

I. —. (1940). **The Tuberculin Test.**—*Aust. vet. J.* **16.** 48–49.

II. Legg, J., & Maunder, J. C. J. (1940). **Synthetic Medium Tuberculins: The Single Intradermal Caudal Fold Test.**—*Ibid.* 50–67.

III. Legg, J., & Maunder, J. C. J. (1940). **Further Tests with Synthetic Medium Tuberculins.**—*Ibid.* 68–71.

IV. Bazeley, P. L., & Barraclough, B. H. E. (1940). **A Report on some Trials with Synthetic Medium Tuberculins.**—*Ibid.* 71–84.

V. Morgan, F. G., & Garnet, J. R. (1940). **A Note on the Preparation of C. S. L. Tuberculins.**—*Ibid.* 85–87.

I. It is only recently that tuberculin testing of cattle in Australia has been undertaken in a systematic manner. This editorial discusses the general problem and draws attention to the series of papers abstracted below.

II. Intradermal tests were carried out on 865 dairy cows all of which were subsequently examined P.M. In the first two series involving 594 animals, the authors used synthetic tuberculin made for the first time in Australia. They concluded that :– (1) two readings are required, but if only one can be done, the 96th-hour reading is to be preferred; (2) the efficacy of the test is high in cases in which the disease is well established and active; (3) very advanced cases may fail to give positive reactions, and (4) the test is of low efficacy in cases showing small lesions. The observations on which these conclusions were founded are described in detail.

In the third series, 271 animals were tested simultaneously with (1) the tuberculin used in the two foregoing series, (2) a Canadian synthetic tuberculin, and (3) old tuberculin concentrated. The two first were used in single inoculations and the last in double intradermal tests. Of 32 tuberculous animals 27 were positive to the Canadian, 27 to O.T. and 29 to the local product. All three products have a tendency to fail in advanced cases. With the synthetic tuberculins there is less difficulty in deciding whether the test is positive or negative. It was again concluded that two readings are required with all three tuberculins.

III. A further series of 453 cows was tested intradermally by two Australian-made synthetic tuberculins and subsequently examined P.M. One product gave more doubtful reactions, *i.e.* small non-typical swellings, than the other. The results further confirmed the conclusion reached in the previous series.

IV. Intradermal tests were carried out on 1,595 cattle using two tuberculins simultaneously. The object was to compare three batches of locally made synthetic tuberculin with the well tried products from the United States Bureau of Animal Industry and with tuberculin from Canada. The results are described in detail and comparisons made on the basis of potency in the field, clarity of reading, and failure to detect tuberculous animals. The authors conclude that with the exception of one of the local batches all products were very reliable and easy to use and there was little to choose between them. It is considered desirable to read the results at both

72 hours and 96 hours.

V. M. gives details about the preparation of the tuberculin used in these field trials. The main batch of synthetic tuberculin was prepared according to the formula used in the United States' Bureau of Animal Industry, and the O.T. according to recognized methods. Two batches of synthetic tuberculin were concentrated by ultrafiltration through an alundum shell impregnated with collodion of a certain concentration designed to give membranes of uniform porosity.—W. I. B. Beveridge.

Rider, J. R. (1941). **A Note on Accuracy of Measurement of the Skin Fold in Tuberculin Tests.**—*Vet. J.* **97.** 173–176.

Measurements were made by three observers on the skin folds of eight cows, " each of which had been injected simultaneously with three tuberculins ". A standard micrometer screw gauge was used and it was found that in 82% of the measurements the observers were able to measure the same fold of skin with a variation not greater than 0·5 mm. The observers had different degrees of experience with the gauge. Each of the cows was negative to each of the three tuberculins used in the tests.—E. C. H.

Canham, A. S., & Blomfield, L. C. (1940). **The Avian Tuberculin Test.**—*J. S. Afr. vet. med. Ass.* **11.** 108–111.

The authors carried out the tuberculin test on a flock of 429 fowls from which a number had been condemned on account of TB. when sent to a market. Before testing considerable variation was noted in the size and consistence of the wattles. No doubtful reactions were observed, but there was great variation in the reactions obtained. As noted by other investigators, severely affected birds sometimes gave slight reactions or even none at all. A few reactors with no visible lesions were observed. There were 98 positive reactors, and in a test of the survivors six weeks later, 35 more reacted of which 31 showed TB. lesions. No further tests were possible as the remaining birds were slaughtered.—E. M. Robinson.

Sahai, L. (1941). **The Inter-Relationship Between the Allergic Responses of Guinea-Pigs Sensitized with Various Members of the Acid-Fast Group of Organisms.**—*Vet. J.* **97.** 113–122.

Groups of g. pigs were sensitized by the subcutaneous inoculation of saline suspensions of cultures of human or avian tubercle bacilli or by the intramuscular inoculation of a liquid paraffin emulsion of *Mycobacterium johnei*, the vole strain of acid-fast bacillus, *Mycobact. phlei*, *Mycobact. smegmatis*, *Mycobact. butyricum*, or *Mycobact. stercoris*. The g. pigs were tested at intervals varying from 35–52 days after inoculation, with decreasing concentrations of mammalian and avian tuberculins, johnin, and glycerin extracts of cultures of the other acid-fast bacilli. G. pigs reacting at a high titre to the inoculation of an extract of the sensitizing organism, reacted to a lesser degree to the inoculation of heterologous extracts. G. pigs sensitized with the vole strain reacted at a titre of 1 : 200 to human strain tuberculin. Inoculation of the saprophytic strains failed to produce any reactions to the vole bacillus extract. G. pigs sensitized with *Mycobact. johnei* reacted well to johnin and avian tuberculin; the inoculation of avian type bacilli produced reactions to johnin in low dilutions only.—E. C. Hulse.

Wiener, A. S., & Herman, M. (1939). **The Second Stage of the Agglutinative Reaction.**—*J. Immunol.* **36.** 255–259.

Marrack [*V. B.* **5.** 568.] has propounded a theory that, in the agglutination reaction, particles of antigen and antibody molecules alternately combine to build up a mosaic. According to this suggestion, the stages of linkage of antibody with antigen and the aggregation of the particles occur simultaneously and are specific.

The experiments of the present authors seem to confirm this hypothesis. Syphilitic sera containing iso-agglutinins were tested against mixtures of Kline antigen and human red cells. In all the experiments the aggregates consisted either of syphilitic antigen-antibody particles or of red cells, never both. Similar results were obtained with human red cells and typhoid bacilli or pneumococci types I and XIV. A tendency towards nonspecific clumping occurred only when the antibody was in great excess.—R. E. Glover.

Rislakki, V. (1940). Jämförande undersökningar angående M.B.F.–, (Meinicke bruzellose - flockungsprobe), agglutinations- och komplementbindningsmetodernas värde vid serologisk diagnostisering av den smittsamma kastningen hos nötkreatur. [**Comparison of the Meinicke Flocculation, Agglutination, and Com-**

plement - Fixation Tests for Bovine Brucellosis].—*Beretn. 5. nord. Vet.-møde, Kbh., 1939.* pp. 297–320. Discussion pp. 321 - 323. [German summary].

The agglutination, complement-fixation, and Meinicke's flocculation tests were used on numerous cattle in newly and chronically infected herds. Technical methods are detailed and results are given in tables. Judging from the highest numbers of results considered positive with each test, the aggln. method (reaction at a titre of 1 : 20) appeared to be the most reliable. The other tests were most valuable in newly infected herds and of comparatively little value in chronic infections. As a check for doubtful results with the aggln. test, R. suggests the use of Meinicke's test, as it is more easily carried out than the c.-f. test. A disadvantage of this flocculation test is the need for the proprietary extract prepared by the Adler Apotheke, Hagen in Westphalia.

In the discussion THOMSEN discussed the aggln. and c.-f. tests, pointing out the value of the latter.—J. E.

ANCZYKOWSKI, F. (1939). Przyczynek do określania miana aglutynacyjnego surowic koni z zawiesina Brucella abortus bovis. [**Agglutination of** *Brucella abortus* **by Equine Serum**].—*Wojsk. Przegl. weteryn.* **10.** 95–126. [Abst. from German summary].

Agglutination tests were made against *Br. abortus* with the sera of 500 healthy horses, 50 army horses with surgical diseases, a few farm horses from farms where there was bovine brucellosis, and two experimental horses, one infected with live *Br. abortus* culture and the other with dead culture. The sera were carbolized and the tubes were kept for two hours in an incubator and then for 20–22 hours at room temperature, before being read.

The horse infected with live culture showed a maximum titre of 1 : 80,000 after 15 days and it was still 1 : 1,280 at the end of 14 weeks. The horse infected with dead culture reacted at a maximum titre of 1 : 5,000 after 15 days and at 1 : 160 at 14 weeks. Only 22 of the other horses had a titre of 1 : 100, whilst 90% of them did not react at a titre above 1 : 20.

It is concluded that brucellosis is rare in horses in Poland.—J. E.

SMITH, M. L. (1939). **The Stability of Staphylococcus α-Antitoxin at Different Temperatures.**—*Quart. J. Pharm.* **12.** 699–706.

The stability of nine various samples of staphylococcus *a*-antitoxin was studied by storing in small sealed ampoules in the dark at 35°C., room temperature (about 19°C.), and 4°C., withdrawing ampoules at various intervals, and testing for antitoxic potency (rabbit cell haemolytic method). The results obtained were somewhat irregular, due in part to incidental variations of storage temperature and errors in testing, but it appeared that the rate of loss of antitoxic potency depended solely on the storage temperature of the preparation and was independent of the concentration of antitoxin originally present, the content of serum protein, the method of preparation of the sample, or presence of a phenolic preservative.

At 4°C. the antitoxin was very stable, and lost only 5% of potency after 42 months' storage. At room temperature, the loss of potency was less than 10% *per annum*, while at 35°C., the loss of potency, up to 18 months, was about 30%.—E. COTCHIN.

WEISS, C., & TARANIK, J. D. (1939). **A Study of Natural and Acquired Immunity of Staphylococcal Toxin in Monkeys.**—*J. Immunol.* **37.** 185–200.

The titre of natural α-antistaphylolysin of 65 monkeys varied between 0 and 25 international units per c.c. of serum, being in 71% of cases between 2 and 8 I.U. By parenteral injections at intervals of increasing doses of staphylotoxin, *via* the intratracheal, intrabronchial, or intracutaneous routes, this titre could be increased to 4–12 times its original level, the response being greater and more rapid in those animals with relatively high initial titres (10–25 I.U.). The rate of increase of titre was greater after intracutaneous than after intrabronchial injection. Passive immunization was effected by large doses of antitoxin (500–10,000 I.U. per kg.).

Neither in normal nor in immunized animals could a constant relationship be demonstrated between the titres of circulating α-antistaphylolysin and the intensity of cutaneous reactions to staphylotoxin, although in most cases it seemed that the "threshold" level at which dermonecrosis was abolished was 10–25 I.U. per c.c. serum.

The possibility that antitoxin may be "fixed" by the tissues of the skin might explain the observation that, in the case of

passively immunized animals, skin reactions remained negative at a time when the serum titres had returned approximately to their original values.—E. Cotchin.

Dolman, C. E., & Wilson, R. J. (1940). **The Kitten Test for Staphylococcus Enterotoxin.**—*Canad. publ. Hlth J.* **31.** 68–71.

Food poisoning with typical symptomatology and epidemiology, with recovery of large numbers of staphylococci from suspected foodstuff, may with fair assurance be ascribed to enterotoxigenic staphylococci. A positive kitten test supplies specific evidence of the capacity of the strain to produce enterotoxin under laboratory conditions. It does not necessarily determine the cause in atypical cases. The same kitten may be used for several tests within a 7–10 day period. Details are given of preliminary examination of material, preparation of enterotoxin, and of the test.—R. Gwatkin.

Lanfranchi, A. (1939). Funzione di antigeni associate con speciale considerazione della associazione ultravirus-bacteri. [**Function of Associated Antigens with Special Reference to the Virus-Bacteria Association**].—*IV Congr. int. Pat. comp., 1939.* **1.** 305–329. [In Italian: English, French, German and Spanish summaries].

An article in rather vague terms on bacterial infections associated with virus diseases. It is stated that associated vaccines have given good results in certain animal diseases, but no reference to any authentic record of such is given.

Koslowski, M. (1939). Die Bedeutung der bedingten Reflexen für die Immunitätslehre. [**The Role of Conditioned Reflexes in Immunity**].—*Frankfurt. Z. Path.* **54.** 104–117.

A reaction by the peritoneum (increase of cells in the peritoneal fluid) was set up by repeated daily intraperitoneal injections of cholera vaccine into g. pigs and rabbits. A mechanical stimulus (ear scratching) was applied at the times of the injections and it was continued after the injections were stopped. The peritoneal reactions continued to be elicited by the mechanical stimulus alone, thus proving the existence of conditioned reflexes in immunity.

When a second stimulus (exposure to ammonia fumes) was added to the mechanical stimulus, the latter ceased to elicit the peritoneal reaction, the conditioned reflex being inhibited.

The theory and possible use of these phenomena are discussed.—J. E.

DISEASES, GENERAL

Crawford, A. B., & Frank, A. H. (1940). **Effect on Animal Health of Feeding Sewage. Swine and Cattle in Severe Six-Month Test Remain in Good Condition; Feedings include Raw Sewage, Treatment Plant Effluent, and Sludge.**—*Civ. Engng, Easton, Pa.* **10.** 495–496.

This is a description of an experiment to determine what effects, if any, occur in animals fed on sewage. It was carried out at the Beltsville Research Centre of the United States Department of Agriculture where several experiment institutions are situated. In 1935 the centre was provided with its own sewage disposal plant, and into it is put in addition to ordinary sewage, material from the animal experiment station, where research is done on mastitis, TB., brucellosis, equine infectious anaemia, equine encephalomyelitis, swine fever, swine erysipelas, and other infectious diseases. While certain buildings are provided with their own septic tanks in which sewage can be disinfected, it is stated that pathogenic micro-organisms may at times pass into the general sewage system.

In 1938 an experiment was started to test the danger of feeding this sewage material to cattle and swine. Eighteen healthy pigs were divided into suitable lots, and groups of them were fed respectively with untreated sewage, sewage sludge, and sewage effluent for a period of six months. Two cows, each with its week-old calf, and two yearling steers were also included to test the effect on them of sewage effluent water as their drinking supply. After six months all the animals were in good health, and for a further six months they were kept in the same quarters and fed and watered normally. The total amounts of sewage material fed per pig during the six-month period were respectively 67½ gal. of untreated sewage, 67½ gal. of effluent, and an unstated amount of sewage sludge. Before, at intervals during, and after, the period of experiment, all the animals were

tested for TB. and for brucellosis, and at no time did any animal react positively. At the end of one year all the animals were killed and examined. They were all in excellent condition and showed no evidence of disease, except one cow which had calcareous parasitic lesions in the intestines and liver.

It is concluded that virulent bacteria were not present in sufficient concentration in the incoming sewage, effluent, or sludge of the sewage treatment plant, to cause disease in susceptible animals. It is believed that the test animals in this experiment were subjected to a more severe exposure to effluent than would ordinarily occur in livestock below a modern type sewage treatment plant.

[As the incoming sewage did not itself cause illness in the animals, the test of the effluent as such appears to be valueless. On the other hand, in view of the origin of the material in the sewage, *viz*, faecal matter of animals excreting pathogenic micro-organisms and viruses, it may be argued that average town sewage is even less likely to be dangerous to animals.]—J. E.

—. (1941). **Report on Diseases of Farm Livestock. Section I. Some Diseases of Cattle : Report and Recommendations.**—*Vet. Rec.* **53.** 3–14.

This is a report compiled by the Survey Committee of the National Veterinary Medical Association on the disease situation in cattle in Great Britain, with special reference to mastitis, contagious abortion, sterility, and Johne's disease. Estimates are made of the probable financial loss caused by them to the country, a review of the important points of the present status of knowledge on them is given, and suggestions for their control are formulated.

—J. E.

—. (1939). Espagne. Situation sanitaire dans l'ancienne zone republicaine. **[Animal Disease Situation in the Former Republican Zone : Spain]**.—*Bull. Off. internat. Epiz.* **17.** 1042–1048.

In spite of adverse conditions, particularly in regard to feeding and management, the animal disease situation was in general not serious. No major epizootic was encountered. Before the civil war, glanders was enzootic in Spanish and Moroccan army horses, and during the war cases were detected in several cavalry regiments of the Republican Army ; in 1938 these constituted less than 1% of the effective horse strength. Sheep pox was the only disease which showed widespread extension during the war. Foot and mouth disease was introduced from France by animals evacuated to that country during a phase of the war and subsequently returned to Spain.—N. J. Scorgie.

Armstrong, W. H. (1941). **Some Autopsy Findings in Fur Animals.**—*Amer. Fur Breed.* **13.** No. 7. 28–30.

This article summarizes the results of P.M. examinations made on ranch fur animals over a period of 18 months. Well illustrated distemper lesions in the lining membrane of the bladder of a fox and a ferret show inclusion bodies, the identification of which serves for rapid differential diagnosis from paratyphoid diseases and nonspecific pneumonias. The prevalence and possible causes of urinary calculi in mink are discussed. Autogenous bacterins were used for an outbreak of paratyphoid in chinchillas. No results are given. Parasitism was prevalent in musk rats. No serious rabbit disease was encountered.

—C. V. Watkins.

—. (1939). **[Report of Committee on] Poultry Diseases [American Veterinary Medical Association]**.—*J. Amer. vet. med. Ass.* **95.** 613–621.

After deploring the lack of interest of veterinary practitioners in poultry disease, the committee reviews certain diseases of current importance. Paratyphoid, usually caused by *Salmonella aertrycke* [*S. typhi-murium*] in fowls and turkeys, is described. Pullorum disease eradication is progressing in 27 states in which about 4½ million fowls were tested (3·4% reactors). The discovery of equine encephalomyelitis virus in pheasants and pigeons is referred to, as well as the position in regard to research on lymphomatosis. The importance is stressed of differentiating between the three distinct respiratory diseases, *viz*, infectious bronchitis, laryngotracheitis, and coryza ; there is available an effective vaccine against laryngotracheitis. The committee suggests that the newly discovered *Hexamita* infection in turkeys be named " infectious catarrhal enteritis ". In order to resolve the confusion in the nomenclature of poultry diseases the committee has co-operated with the North-Eastern Conference of Laboratory Workers, which had begun work on a check list of diseases and parasites of birds. The committee has decided to publish the check list section by section in its reports, and

in this report the list of virus diseases is given. It includes the name of choice of the disease, English and foreign synonyms and a list of susceptible domestic and wild birds (also susceptible mammals including man). References to relevant literature are also given. [Newcastle disease is named incorrectly as " New Castle disease ".]—J. E.

WINTON, B. (1940). **Progress of the National Improvement Plan with Special Reference to the Control of Pullorum Disease.** —*Proc. 43rd ann. Meet. U.S. Live Stk sanit. Ass., 1939.* pp. 176–185.

The National Poultry Improvement Plan was adopted in 1935 with the objects of increasing production, improving breeding qualities, and reducing losses of birds from pullorum disease. Although only on a voluntary basis, considerable success has already been attained. The number of states participating has increased from 34 in 1935–36 to 44, and the number of hatcheries from 1,017 to 2,033. In 1935–36 only 30 states participated in the pullorum-testing part of the plan and 2,053,159 birds were tested. In 1938–39, 42 states complied with the testing regulations and 6,772,031 birds were tested.

Pullorum testing in the field is under the direction of livestock sanitary authorities or state agencies. Three progressive pullorum-control classes are recognized, *viz*, pullorum-tested, pullorum-passed, and pullorum-clean. Trained laymen perform the tests in the pullorum-testing class, but all other testing is done by qualified officials. The test employed is optional. The stained-antigen rapid, whole-blood test is used in 25 states, the standard tube agglutination test in nine states and the rapid serum test in one state. Combinations of these tests are used in the remaining seven states.

All work upon the farm is completed at a single visit in late summer or autumn. This procedure reduces handling of the birds to a minimum and lowers the cost of operation of the plan.—D. D. OGILVIE.

I. KUBES, V. (1938). Estudios preliminares sobre la Derrengadera y Peste Boba en la región de los llanos. **[Studies on *Derrengadera* and *Peste Boba* of Horses in Venezuela].** pp. 10. Caracas, Venezuela: Ministerio de Agricultura y Cría. [8vo].

II. KUBES, V. (1939). Estudio acerca de la existencia de la anemia infecciosa de los equinos en la América del sur, su presencia en Venezuela y confusión con la tripanosomiasis caballar.—Las llamadas " Peste Boba " y " Derrengadera ". (Segunda communicación preliminar). **[The Existence of Equine Infectious Anaemia in South America, and its Confusion in Venezuela with Equine Trypanosomiasis (*Peste Boba*, *Derrengadera*). II].** pp. 36. Caracas, Venezuela: Ministerio de Agricultura y Cría. [8vo].

I. From his investigations on the disease known as *derrengadera* or *peste boba*, K. concludes that the causative agent is a filtrable virus. The virus is biologically similar to the virus of equine infectious anaemia, and causes a disease with almost identical features. The disease is often accompanied by a trypanosome infection which produces similar symptoms.

II. It is suggested that a chronic, subclinical form of E.I.A. occurs in Venezuela, and that when an animal so affected contracts *Trypanosoma venezuelense* infection, a rapidly fatal illness develops. The symptoms of the two diseases are remarkably similar, the well-known weakness of the hindquarters in trypanosomiasis being present also in E.I.A.

In field observations it was noted that where disease was sporadic *T. venezuelense* was concerned, but wherever the disease tended to become epizootic the virus of E.I.A. was found. A large number of blood tests were made, there being a notable similarity in the two diseases. No details of the results of the tests, however, are given.—MILLER WATSON.

I. QUEVEDO, J. M. (1939). Estomatitis Pustulosa Contagiosa de los equinos. **[Contagious Pustular Stomatitis in Horses].**—*Rev. Med. vet., B. Aires.* **21.** 39–45.

II. BAUDOU, A. C. (1939). Observaciones sobre estomatitis vesicular de los caballos. **[Equine Vesicular Stomatitis in the Argentine].**—*Ibid.* 361–367.

I. Several enzootics of contagious pustular stomatitis of equines in the Argentine are described. The naturally infected animals had extensive areas of ulceration on the tongue and lips which healed slowly.

Material from the lesions was used for experimental infection and it was applied to the scarified lips and gums of horses which developed the typical symptoms. There were cases in which catarrhal conjunctivitis was a

feature, and coryza and ulceration of the nasal mucosa were also noted.

Attempts to infect oxen, sheep, and swine failed, but g. pigs proved susceptible. In these animals a vesicle formed at the site of inoculation (dermis of foot pad) in 36–48 hours after inoculation with a cell-free filtrate of vesicular fluid. In some cases the lesions appeared on the other feet and on the tongue.

The virus could be passaged in g. pigs, but gradually became attenuated unless passed through horses. By filtration methods the virus appeared to be larger than the virus of foot and mouth disease and was adversely affected by acid media and high temperatures.

II. B. describes a recent outbreak of equine contagious vesicular stomatitis. It was found that, in addition to the mouth, vesicles may also appear on the scrotum, mammary gland and occasionally on the feet, where they are located usually round the coronary band. In no case were pustules observed. By artificial infection g. pigs proved susceptible and the disease could be passed from one to another. Horses were infected artificially and cattle proved susceptible to artificial as well as natural infection, although the latter was of very mild character. Rabbits were not susceptible.

No cross-immunity with foot and mouth disease could be demonstrated in g. pigs.

—Miller Watson.

Dickinson, C. G. (1940). **Haematuria in Cattle.**—*Aust. vet. J.* **16.** 224–226.

This address reports the progress of investigation on chronic bovine haematuria. Examination of urine from affected and non-affected areas showed less sulphates than normal in urine from affected areas. A paddock in an affected area was therefore treated with gypsum. Cattle kept in this paddock developed the disease two years later than control animals on an untreated area. This is of doubtful significance. Another trial is being conducted, soil from affected areas being fed to cattle. After seven months' feeding, one animal which had ingested 515 lb. of soil, was found to be affected.—W. I. B. Beveridge.

Götze, R. (1940). Leptospirenbefunde beim bösartigen Katarrhalfieber des Rindes. VI. Mitteilung. **[Leptospira in Cattle with Malignant Catarrh. VI].** —*Dtsch. tierärztl. Wschr.* **48.** 517–519. [For previous parts, see *V. B.* **1.** 89; **3.** 653, and **5.** 666].

G. briefly recapitulates the findings of his earlier work on bovine malignant catarrh, *i.e.*, that it is transmissible by blood inoculation, with an incubation period of 14–63 days, and that sheep act as carriers of the bovine disease. As the pathogenic agent is not filtrable, a spirochaete was suspected, and these organisms were detected, by dark-ground illumination or Levaditi staining, in preparations from the mucous membrane of the mouth and muffle, and from the skin and kidneys. These spirochaetes are extremely fine, 0·1–0·2μ thick, and usually more or less straight, though coat-hanger and question-mark forms were encountered. Distinct windings could not be detected, but from the granular appearance it was considered that the organisms were leptospira, and the name *Leptospira catarrhalis* is suggested. [Except that they were found in tissues of affected animals, no evidence is offered of their aetiological importance in bovine malignant catarrh.]—U. F. Richardson.

Götze, R. (1941). Die Häematomkrankheit (Hämatomosis) bei Rindern. **[Haematoma Disease (Haematomosis) in Cattle].** —*Dtsch. tierärztl. Wschr.* **49.** 9–10.

G. records the frequent occurrence of subcutaneous haematomas in young cattle, 9–18 months old, towards the end of the winter. The commonest site is the thoracic or abdominal wall; other sites include the neck, shoulder, sternum, thigh, and udder. Haematological examination shows a marked fall in the red cell count and haemoglobin content. The coagulation and bleeding time are within normal limits.

The aetiology of the condition is obscure. There is only occasionally a history of injury; and G. considers that a dietary deficiency is the most likely factor, bringing about a haemorrhagic diathesis which favours the formation of a haematoma in the subcutaneous tissues following even quite trivial injuries.

Treatment comprises attention to the diet with provision of good hay together with green food or silage. In animals which are very anaemic repeated blood transfusions may be given, 800–1,600 c.c. according to body weight. Surgical treatment is usually unnecessary if the haematomas are small; larger ones should not be opened for at least 4–8 weeks in order to reduce the liability to severe haemorrhage.

—E. G. White.

Glenney, W. C. (1940). **So-Called Shipping**

Fever in Dairy Cattle.—*J. Amer. vet. med. Ass.* **96.** 461–465.

The data in this paper have been derived mostly from field experience of a large number of cases of " shipping fever ". The disease causes the heaviest losses during the colder months, September–April. Cattle of any age may be affected, but G. limits his observations to pregnant and newly calved cows. In animals contracting the disease as a result of shipment, change of feed or management, *Pasteurella boviseptica* appeared to be the causal organism. In spontaneous outbreaks involving no change of any kind, G. states that diphtheroid streptococci and *Bacterium coli* were the organisms usually encountered, and rarely *P. boviseptica*. The incubation period in cases in which accurate information was available was 5–7 days. The symptoms common to both types were a rise in temperature and coughing, whilst in the spontaneous type of outbreak there was usually also diarrhoea. For prophylaxis, " pulmonary mixed bacterins " gave the best results if 7–14 days could be allowed for immunization before shipment; haemorrhagic septicaemia antiserum gave poor results. For treatment G. considers that a combination of bacterins and sulphanilamide therapy gives the most promising results.—N. J. Scorgie.

Swan, L. C. (1939). **Infectious and Toxic Encephalomyelitis.**—*Canad. J. comp. Med.* **3.** 228–229.

An outbreak of disease affecting over 60 horses during the late summer of 1938 manifested symptoms clinically identical with those of equine encephalomyelitis. Two laboratories were unable to demonstrate virus in brains from these cases, and this finding was supported by the fact that vaccinated horses developed the disease and cases continued to occur after the first frosts. In the late winter, early spring, and summer of 1939 further cases occurred which were successfully treated by cathartics followed by an intestinal antiseptic or pilocarpin.

Observations indicate that the condition is associated with the feeding of lucerne hay. It was also noted that blood from animals fed this hay did not clot normally.—L. M. Heath.

Swett, W. W., Matthews, C. A., & Graves, R. R. (1940). **Early Recognition of the Freemartin Condition in Heifers Twinborn with Bulls.**—*J. agric. Res.* **61.** 587–623.

This report is based on the *ante-* and *post-mortem* study of 17 heifers twin-born with bulls. A very wide range in the degree of abnormality was found; only 2 of the 17 were found on P.M. examination to have normal genital development. Those kept to breeding age proved to be sexually abnormal and incapable of reproduction. The 15 freemartins were all undersized, probably due to the fact that they were twin-born rather than that they were freemartins. The pituitary was actually smaller in the freemartins than in the animals used for comparison, although on the basis of the number of grams of pituitary per unit of body weight the freemartins had the heavier pituitaries. Cytological studies revealed that the freemartin pituitaries were intermediate between the condition found in the castrated bovine and that of the normal cow. The development of the mammary gland after one month of age was abnormally small, and in most cases there was a high proportion of fat to gland tissue. Early clinical indications of a freemartin incapable of reproduction were considered to be small or atypical udder development, enlarged clitoris, and a fold of skin, sometimes containing a cord, extending along the median plane of the body from a point above the attachment of the udder to the navel. These features may not all be present in one animal, although the first two are usually present. The authors conclude that the chances are slight that a heifer twin-born with a bull will be sexually normal. This paper includes an extensive list of references to the literature on freemartinism.—N. J. Scorgie.

Rowlands, W. T., & Harbour, H. E. (1941). **" Pining " in Lambs on Permanent Pasture in N. Wales.**—*Vet. Rec.* **53.** 153–156.

The results of investigations at three centres in North Wales, on the cause of " pining " on permanent pastures suggested that (1) " pining" is due either to a low-grade parasitic infestation readily prevented by regular dosing with an efficient anthelmintic, or to a cobalt deficiency; both causes may operate simultaneously, and (ii) " pining " is of a dual nature, being primarily a cobalt deficiency, later supplemented by a low-grade parasitic infestation. Another possibility was that one form of " pining " may have been due to deficiency of an undetermined trace element (iron, iodine, etc.) which lowers the normal resistance of the lambs to the effects of low-grade parasitism.

The authors confirm the high efficiency of phenothiazine as an anthelmintic in sheep.
—N. J. Scorgie.

—. (1940). **Discussion on the Aetiology and Morbid Anatomy of Fowl Paralysis (Neurolymphomatosis).** [Speakers :- Blakemore, F., Glover, R. E., Bayon, H. P., McGaughey, C. A., & Hughes, L. E.]—*Proc. R. Soc. Med.* **34.** 109–116.

Blakemore [see also *V. B.* **10.** 40.] reported that in the course of experiments in which fowl paralysis was successfully transmitted to young chicks, there occurred an acute fatal condition in which lesions of a type not hitherto observed were present in some of the visceral organs of affected chicks. The possibility was considered that this atypical response resulted from the inoculation of a second agent, but further experiments showed that the atypical lesions really represented an early stage in the development of the lymphomatous process. Later experiments showed that fowls over the age of 12 months were resistant to infection, but inoculation of material from acute cases caused paralytic symptoms in chicks 2–5 months of age. In these, marked nerve lesions were found on autopsy and also infiltration of the liver and heart. Histological studies confirmed the possibility that the acute and chronic manifestations were different phases of the same disease. Similar lesions have been observed in young birds from three affected flocks. Clinically, the experimental disease closely resembled the more severe type of natural outbreak. In the course of the experimental work reported, great differences were found in the susceptibility of different strains of fowl. The position was further complicated by the fact that some fowls did not develop the lymphomatous type of response to any extent, although they showed evidence of the acute disease following injection, *e.g.* the Cambar breed.

Using material derived from a turkey affected with neurolymphomatosis, Glover stated that he had been able to confirm Blakemore's observations. G. and other speakers also confirmed the differences of susceptibility among different strains of fowl.

McGaughey reported that in experiments with eggs from a strain of fowl susceptible to the agent, the embryo died in many cases after 3, 4, or 5 days; in other cases, the chicks hatched and developed symptoms similar to those shown by chicks inoculated when a few days old. At autopsy, lesions similar to those described by Blakemore were found.—N. J. S.

Beckman, C. H., & Torrey, J. P. (1941). **Further Studies on Canine Encephalitis.** —*N. Amer. Vet.* **22.** 39–46.

Gross morbid changes in natural cases of canine encephalitis are described and illustrated; symptoms, diagnosis, and treatment occupy the rest of the paper. Only brief mention is made of histopathological findings.
—J. W. Whittick.

Stewart, O. W., Russel, C. K., & Cone, W. V. (1941). **Injury to the Central Nervous System by Blast. Observations on a Pheasant.**—*Lancet.* **240.** 172–174.

A pheasant, discovered in close proximity to a bomb crater, was found to be in a dazed condition with symptoms of muscular rigidity. There were no signs of trauma. P.M. examination revealed haemorrhage of the heart and lungs, with capillary congestion of vessels in the cranial meninges and haemorrhage in the fore brain. Other cases are quoted.

It is suggested that the nervous lesions were the result of back pressure of the venous system on the central nervous system following compression of other parts of the body, particularly the thorax. It is possible that under certain conditions this pressure will cause cessation of nerve cell activity without producing macroscopic or microscopic evidence of injury.—C. W. Ottaway.

Daugherty, W. D. (1941). **Respiratory Diseases of Swine with Special Reference to Bull Nose in Pigs.**—*N. Amer. Vet.* **22.** 156–158.

A description is given of an infectious rhinitis of young pigs. Acute, subacute, and chronic forms are differentiated, and it appears that the younger the pig the more acute is the attack. Mortality in acute cases is nearly 100%, and survivors from the more chronic cases are unprofitable as store-pigs.

D. suggests that *Pseudomonas pyocyanea*, which has usually been incriminated as the causal organism, is probably a secondary invader. *Brucella bronchiseptica* has been isolated in a number of cases, and D. claims encouraging results from the use of a mixed bacterin of canine origin. He believes that the condition may in all instances be a primary *Br. bronchiseptica* infection.—A. N. Worden.

THORP, F., Jr., & TANNER, F. W. (1940). **A Bacteriological Study of the Aerobic Flora Occurring in Pneumonic Lungs of Swine.**—*J. Amer. vet. med. Ass.* **96.** 149–160.

This paper comprises a brief resumé of the relevant literature, together with the detailed results of bacteriological examination of 166 pneumonic and 38 apparently normal pig lungs obtained from routine autopsies conducted at the animal pathology laboratory of the University of Illinois. [The diseases diagnosed at autopsy are stated, but there is no description of the tissue changes in any of the lungs examined and no indication that any organism tended to be associated with a certain type of lesion.] Of the 38 apparently normal lungs, one only yielded a micro-organism, an α-haemolytic streptococcus. Bacteria were not recovered from 47 of the pneumonic lungs, but 153 strains were isolated from the remaining 119. Yeasts were not isolated in any case, but in about one-third of all groups, moulds and actinomyces appeared upon the media employed for primary isolation. The bacteria isolated were :– streptococci, mostly α-haemolytic (67 times), diplococci (10), staphylococci (1), *Pasteurella* (44), Gram-negative rods, designated "*Alcaligenes*" (11), and miscellaneous Gram-negative and Gram-positive rods, probably contaminants, (20). A limited number of agglutination tests were conducted on material from rabbits with some of the streptococcus, pasteurella and diplococcus strains : there was evidence of serological relationship within members of the group in the case of the streptococci (three α-haemolytic groups) and diplococci, but the evidence for such correlation in the case of the pasteurella strains was not satisfactory.—ALASTAIR N. WORDEN.

ANDBERG, W. G., BOYD, W. L., & CODE, C. F. (1941). **Syndrome of Temporary Alveolar Pulmonary Emphysema (Heaves) in the Horse Following Intravenous Injection of Histamine.**—*J. Amer. vet. med. Ass.* **98.** 285–287.

A yearling colt and two aged mares were used to determine the clinical symptoms resulting from the intravenous injection of histamine. 40 mg. doses of histamine dissolved in 25 c.c. of physiological saline were injected into the jugular, the speed of injection varying from 6 sec. to 4 min. The main symptoms produced included increased activity of the secretory glands, difficult breathing, and increased peristalsis, the injections of longer duration appearing to prolong the symptoms. The intestinal and respiratory symptoms indicated contraction of the smooth musculature, and venous blood taken during the respiratory difficulty was extremely dark. Increased secretions included lachrymation, sweating, and exaggerated action of the glands of the respiratory and intestinal tract. The authors mention that the sweating may have been due to the release of adrenalin into the circulation following the histamine injection.

Towards the end of the histamine experiments the two mares were sensitized to egg albumen and their symptoms, following the production of anaphylactic shock, were observed. It was found that the result of the injection of histamine was indistinguishable from the manifestations of acute anaphylactic shock while, but for the absence of coughing, the symptoms were characteristic of acute alveolar emphysema (heaves).—K. C. SELLERS.

SCHOBER, B. (1941). **The Production of Glomerulo-Nephritis in Animals by the Injection of Serum from Patients Suffering from Nephritis.**—*Edinb. med. J.* **48.** 322–334.

During the last few years the view has gained ground that glomerulo-nephritis in man may be allergic in nature, the evidence coming mainly from the experimental production of glomerulo-nephritis in rabbits or rats by injecting anti-kidney serum produced in another species (usually ducks). There are difficulties, however, in explaining the human and experimental disease on this basis and a toxic origin has been suggested.

S. was able successfully to reproduce a condition in rats resembling human glomerulo-nephritis by the subcutaneous injection of plasma or serum from human patients with progressive chronic glomerulo-nephritis. Unfortunately, most of the rats were infected with a protozoon, *Klossiella muris*. This parasite appears to have little effect on the host, although it does give rise to some interstitial infiltration in the kidney. S. considers that the presence of the parasite did not interfere with the results of his experiments.

Plasma from which the proteins had been removed by ultrafiltration produced similar results to whole plasma or serum, and it is suggested that the cause of glomerulo-nephritis

is a toxic principle which produces primarily an increased permeability of the glomerular capillaries. Attempts are being made to isolate and identify the hypothetical substance or substances.—E. G. WHITE.

BAUMANN, R. (1941). Ostitis fibrosa bei der Katze. **[Osteitis Fibrosa in the Cat]**.—*Berl. Münch. tierärztl. Wschr.* March 28th. 157–159.

This is a detailed description, illustrated by photographs and photomicrographs, of a case of osteitis fibrosa in a one-year-old male cat. The animal was killed because of swelling of the head and the carcass sent to the pathological department of Vienna veterinary high school. The whole skeleton was affected and the macroscopic and histological features were essentially those seen in osteodystrophia fibrosa in other domestic animals. This appears to be the first record of the condition in a cat. —E. G. WHITE.

DOBBERSTEIN, J. (1940). Die Leukosen der Tiere. **[Leucosis in Animals]**.—*Med. Welt.* **14.** 189–191.

This is a brief review of leucosis in animals with especial reference to similarities to the condition in man. Most of the material discussed in this paper has already appeared elsewhere [*V. B.* **10.** 949].—E. G. WHITE.

VASSEUR, M. (1939). Le thymus, ses fonctions et ses tumeurs. **[Functions and Tumours of the Thymus Gland]**.—*Thesis, Alfort.* pp. 213.

Of the nine chapters which form this thesis the first three and the seventh are devoted to a discussion of the general pathology, histology, and physiology of the thymus in man and animals. Chapter four includes a review of the literature dealing with neoplasms of the gland in domestic animals and a detailed description of ten such cases (four horses, one calf, one pig, one dog, two rabbits, and one sheep). One of these cases had already been recorded by NYKA (1929); the other nine are apparently recorded for the first time. The fifth chapter deals with tumours of the thymus in man and includes a chronological list of references; chapter six is a comparison of the features of human and animal tumours with special reference to their histogenesis. The last two chapters comprise the conclusions and the main bibliography, the latter occupying 26 pages.

Among domestic animals tumours of the thymus appear to be most common in sheep and rabbits. In the rat they are extremely common. The essential histological features are similar in human and in animal tumours, but the peculiar syndrome of myasthenia which may accompany thymus tumours in man has not been described in animals. The neoplasms should be classed as lympho-epitheliomas. When metastasis occurs the secondary tumours have a predilection for the kidney.

This thesis gives a useful and very comprehensive review of the subject and includes original observations in a field which has received very little attention in veterinary pathology.—E. G. WHITE.

LÁSZLÓ, F. (1941). Neurofibrom des Truncus nervi sympathici und seiner Ganglien. **[Neurofibroma of the Sympathetic Nerve Trunk and its Ganglia]**.—*Dtsch. tierärztl. Wschr.* **49.** 85–86.

This is a case record of a cow affected with tumour formation of the sympathetic nervous system. Most of the ganglia in the thorax were involved, but the nerve trunks themselves were only slightly involved. The first thoracic ganglion on each side was very enlarged and in contact with the ribs. Generally speaking the swellings were smooth, white, and soft, and contained mostly fibrous tissue. No reference is made to the effect on the animal in life.

—C. W. OTTAWAY.

BONSER, G. M., & WAINMAN, L. M. (1941). **A Further Experimental Study of the Antagonism Between One Malignant Tumour and the Appearance of Another in the same Animal.**—*J. Path. Bact.* **52.** 263–266.

Results from two previous experiments suggested that no antagonism existed between a malignant tumour in one organ and a tumour of another type in another organ. To obtain more conclusive evidence a further experiment was devised. Female mice, 19-weeks-old, of a strain in which spontaneous mammary tumours occurred, were painted on the skin of the shoulder with a carcinogenic substance. Mice of this age were chosen in order that the development of the artificially produced skin growths should coincide with the appearance of the mammary tumours. By this means it was shown that skin warts and cancers were not inhibited by coexisting breast tumours and that the converse also held true.—K. C. S.

BONSER, G. M. (1940). **The Value of Inbred Mice in Relation to the General Study of Mammary Cancer.**—*Brit. med. J.* Jan. 27th. 125–126. [Author's summary copied *verbatim*].

The question of the desirability of using highly susceptible inbred strains of mice for the experimental elucidation of the problems of breast cancer is discussed.

An experiment undertaken to discover whether outbred differ from inbred mice in their tendency to develop mammary cancer in other sites after the surgical removal of a primary mammary cancer is described.

The results of the experiment suggest that the difference is a quantitative rather than a qualitative one, and that the high degree of susceptibility of inbred strains to breast cancer is merely an exaggeration of the disease as it appears in outbred mice.

I. FRENZ. (1941). Ausgedehnte Papillomatose in einem Jungrinderbestand. **[Severe Papillomatosis in a Herd of Young Cattle]**.—*Dtsch. tierärztl. Wschr.* **49.** 158–160.

II. ROSENBERGER, G. (1941). Ursache und Behandlung der Papillomatose des Rindes. **[Causes and Treatment of Papillomatosis in Cattle]**.—*Ibid.* 177–181.

I. A very high incidence of papillomatosis was observed in a herd of cattle over a period of two years. The most common situation of the lesions was the skin of the back of the knee and of the front of the hock. In the milking cows the teats were often affected. The lesions were most widespread in animals about nine months old. Operative treatment was difficult owing to the extent of the lesions, although from three animals F. removed a total of 3 kg. of papillomatous growth in a single day by the use of the Burdizzo pincers. A variety of methods of medicinal treatment were tried without much success. The condition appeared to be transmitted from one animal to another and also to the hands of F. and of a worker on the farm.

II. Among 5,225 cattle admitted to the bovine clinic at the Hanover veterinary school during the years 1935–40 there were 131 cases of papillomatosis. This paper deals with the condition as it occurs in young animals, the lesions being widely distributed as described by FRENZ in I. R. was able to transmit the disease with both filtered and unfiltered material from a spontaneous papilloma. The tumour arising from the injection of the unfiltered material developed more quickly and grew at a greater rate than the tumour from filtered material. Six hours elapsed between removal of the papilloma from which the infective agent was prepared and the injection of filtered and unfiltered material into healthy cattle.

In view of the probable infective character of the condition it is recommended that warts in cattle should be removed as soon as they are noticed, in order to protect other cattle from becoming infected. A large variety of therapeutic measures have been tried by different workers, but R. suggests that a radical surgical operation at an early stage is the only successful method. The subcutaneous tissues are never involved and the operation should involve only the skin, down to and including the corium. Stress is laid on careful washing of the operation site with soap and water both before and after the operation in order to remove the infective material. If lesions are widespread the operation may have to be carried out in two or three stages at eight-day intervals. Disinfection of the stall and utensils is also advisable. This treatment was successful in 129 of the 131 animals and there was no recurrence of the lesions.—E. G. WHITE.

THIERSCH, H. (1940). **Infectious Myxoma and the Experimental Cholesterol-Atheromatosis of the Rabbit.**—*Aust. J. exp. Biol. med. Sci.* **18.** 57–61.

Rabbits were fed cholesterol to produce atheromatosis and then infected with myxomatosis and the resultant lesions studied. It was found that the course of the disease was not affected by the existence of atheroma nor were the lesions. Myxomatous lesions did not absorb fat even under extreme lipaemia.

—W. I. B. BEVERIDGE.

FRIEDEWALD, W. F., & KIDD, J. G. (1940). **Specific Absorption of Antibody with Extracts Containing the Rabbit Papilloma Virus (Shope).**—*Proc. Soc. exp. Biol., N.Y.* **41.** 218–220.

The complement-fixing and virus-neutralizing antibodies present in the sera of rabbits having natural or experimental papillomatosis could be readily absorbed at the same time when the sera were mixed with extracts or filtrates containing the rabbit papilloma virus.

When the sera and virus were mixed in optimal proportions, the mixtures were found to be neutral, *i.e.* they contained neither virus nor antibodies, but when an excess of antibody or of virus was used then there was a proportionate amount of one or the other left in the supernatant after centrifugation.

The findings indicated that the virus itself was involved in the antibody absorption. Extracts of the Brown-Pearce tumour tested concurrently had no power to fix or absorb the antibodies.—J. S. PATERSON.

COWDRY, E. V. (1940). **Properties of Cancer Cells.**—*Arch. Path.* **30.** 1245–1274.

This is a general review of the properties of malignant cells, *viz*, their morphology, functional characters, adaptability, susceptibility to irradiation and viruses, etc. These properties are in each case compared with those of normal cells and the points of similarity and difference are indicated. At present there is no reliable basis on which a single cell can be identified as being malignant. Malignancy is a functional attribute.

The types of malignant cell probably outnumber the types of normal cell from which they arise; there is no such thing as *the* cancer cell.

The lines along which further contributions to an understanding of these problems may be expected are pointed out. They include:—micro-incineration, spectrographic and polarigraphic analysis, ultracentrifugation, X-ray diffraction, and the behaviour of substances made radioactive by a cyclotron. New chemical and physical methods which can be applied to small pieces of tissue are needed.

Those interested should consult the original paper which contains over 100 references.

—E. G. WHITE.

KUSTER, H. (1939). Untersuchungen über den Nachweis von Virus in menschlichen Tumoren mit Hilfe der Fluorescenzmikroskopie. [**The Demonstration of Virus in Human Tumours by Means of the Fluorescence Microscope**].—*Frankfurt. Z. Path.* **53.** 374–389.

Virus-like particles similar to those demonstrable in cell-free preparations of the Rous tumour were found in cell-free preparations of five out of 97 human tumours examined by fluorescence microscopy. Whether these particles really did indicate a virus, which might have been the causal agent of the tumours or merely a virus from some other situation of the body which had found the tumour a suitable medium for survival, was open to question.

—H. H. SKINNER.

NUTRITION IN RELATION TO DISEASE

EGGEBRECHT, H. (1938). Die botanisch-mikroskopische Futtermitteluntersuchung als Hilfsmittel zur Aufklärung von Tiererkrankungen. [**Botanical-Microscopical Examination of Foodstuffs as an Aid to the Explanation of Animal Diseases**].—*Kühn-Archiv.* **49.** 408–412. [Translation of abst. in *Jber. Vet. Med.* **64.** 12].

The importance of the examination of foodstuffs for purity and freshness is shown by the following instances. Sheep sickened and died after eating grain sweepings containing corn cockle seeds; cows had diarrhoea after eating ground-nut cake containing castor seeds, and a horse died from eating wheat bran containing castor beans. Contamination of food by darnel and vetches was harmful for animals, but ruminants can eat vetches without ill-effects. Sand, earth, and oat hairs may clump together in the intestine and cause colic. Husks of oats, rice, millet, cocoa, and ground nuts in large amounts cause indigestion. Mouldy soya beans cause constipation and death in cattle and swine, from the effects of the protein breakdown products formed. Cows fed on hay with a sporulating fungus growth suffered a fall in milk yield and fat content. Weaned pigs died of gastritis after eating mouldy cake and mules died after eating mouldy pea straw. Food infested by mites is harmful and rolled barley so infested caused severe diarrhoea and death in a horse, piglets, and pigs. In another instance mite-infested mixture caused diarrhoea and death in sheep and chickens, from enteritis and nephritis.

SALENY, J. (1939). Hyperglykaemie? [**Hyperglycaemia (?) in Horses and Cattle**].—*Zvěrolék. Obz.* **32.** 191–195. [Abst. from German summary].

Speculation on the cause of haemoglobinuria in horses fed large amounts of sugar beet and of a condition resembling grass tetany in cattle

recovering from foot and mouth disease and fed large amounts of turnips.

HAWTHORNE, G. A. (1941). **Nutritional Diseases of Swine.**—*N. Amer. Vet.* **22.** 147–155.

A review which contains a few original observations. H. states that he has had considerable success in the treatment by nicotinic acid of necrotic enteritis and also of the so-called haemorrhagic dysentery of swine. Daily doses of from 40–150 mg. per head were employed. A common P.M. finding in animals which have died after a period on a diet deficient in factors of the B complex is said to be a full stomach and an almost completely empty intestine. It is suggested that this is a possible cause of the anorexia which is commonly present before death.—A. N. WORDEN.

NELSON, J. A. (1939). **Dietary Problems of Ranch Raised Mink.**—*Canad. J. comp. Med.* **3.** 205–210.

Enteritis is a common ailment and is principally induced by the cereal portion of the ration. Among other causes is ingestion of stale meat foods; overfeeding may result in hoarding of meat which becomes unwholesome before it is eaten. Deficiency of vitamin A may result in kidney or bladder stone and abortions. Kit cannibalism is common; this may be due to dietary deficiencies, external influences, over-development of the skeletal structure of the kit which results in the female destroying the young while trying to remove them, and in some cases to unknown causes. Several theories are suggested for tail biting and tail sucking, intestinal fermentation being considered most probable. Agalactia seems to be a more acute form of the condition which induces cannibalism through sublactation, and it is believed to be connected with the use of less liver in the ration owing to the increase in price.—R. GWATKIN.

I. SÖDERLUND, H. (1940). Erfarenheter rörande kalciumterapin vid paresis puerperalis hos ko. [**Experience of Calcium Therapy of Milk Fever**].—*Beretn. 5. nord. Vet.-møde, Kbh., 1939.* pp. 631–640. Discussion pp. 658–669. [In Swedish].

II. HALLGREN, W. (1940). Den puerperala hypocalcemiens etiologi hos ko. [**Cause of Puerperal Hypocalcaemia in Cows**]. —*Ibid.* pp. 640–658. Discussion pp. 658–669. [In Swedish: French summary].

I. S. sent a questionnaire to Finnish veterinary surgeons to enquire about their experiences in the treatment of milk fever. This paper is a general discussion of the replies, but no analysis is given. Four therapeutic methods were used :– udder insufflation, injection (subcutaneous or intravenous) of $CaCl_2$, of $CaCl_2$ + $MgCl_2$, and Ca gluconate or boro-gluconate. $CaCl_2$ gives the most rapid cure; it is best given intravenously as it is apt to cause abscesses after subcutaneous injection. The gluconate and boro-gluconate are slower in action but not locally injurious to the skin. S. uses the following mixture :– Ca gluconate 60 g., chalk 5 g., boric acid 8 g., and distilled water 100 g. The chalk is added to neutralize the solution, which is given intravenously. Relapses sometimes occur after Ca therapy; they can be prevented by udder insufflation at the time of Ca therapy.

II. H. reviews the literature on milk fever and gives the results of his observations. He found that the Ca content of the blood of normal dry cows was the same in jugular vein blood as in milk vein blood (10–13 mg %), that at calving time it fell in blood from both veins, but was lower in milk vein blood. This disproportion was maintained during lactation, indicating the demands of the udder for Ca from the blood. In cases of milk fever the Ca content was reduced in blood from both veins and was about equal in both with a tendency for a higher content in jugular vein blood. The blood pressure was found to be subnormal in cows with milk fever. Observations were also made on milk fever with reference to barometric pressure, but no striking connexion was noticed.

In the discussion on these papers BUGGE NAESS reported his experience in the treatment of milk fever in Norway, where he has successfully treated 1,200 cases in ten years, by $CaCl_2$ intravenously (25 g. of the dry powder in 2–3 litres of water). He found no advantage in adding $MgCl_2$, but where acetonuria was present 150–200 g. of glucose were given also. CARLSTRÖM explained his theory by which he considers milk fever to be connected with B_1 avitaminosis [see also *V. B.* **11.** 470.], and described in detail one case which failed to respond to udder insufflation and Ca therapy, but which recovered quickly after receiving

30 mg. aneurin phosphate. CHRISTENSON reported good prophylactic results against acetonaemia with commercial irradiated yeast. —J. E.

SCHWAB, J. T. (1940). **A Report of Thirty Cases of Acetonemia.**—*Canad. J. comp. Med.* **4.** 82–88.

In the treatment of these cases dextrose solution was given intravenously and chloral hydrate by mouth. The initial dose of the latter was 1–2 oz. and solution was left so that the equivalent of one oz. per day could be given for the next 4–5 days. Nearly all the uncomplicated cases recovered. The condition occurred in animals ranging from first-calf heifers to nine-year-old cows, and 70% of the cases occurred during the stable-feeding periods of the year. There were five complicated cases. —R. GWATKIN.

CRANDALL, L. A., Jr. (1941). **A Comparison of Ketosis in Man and Dog.**—*J. biol. Chem.* **138.** 123–128.

Fasting ketosis induced in man developed within 39 hours compared with 2–3 days in the dog, and the total ketone values at these points were much higher in man than in the dog, with a lower percentage of the β-hydroxybutyric acid fraction. The ratio of total ketone bodies in blood to those in urine was about the same in both species, but the reduction in ketonaemia following glucose administration was apparently more rapid in the dog. In other respects there appeared to be no fundamental difference between the two species in ketone body metabolism.—ALFRED EDEN.

FOLLIS, R. H., Jr., DAY, H. G., & MCCOLLUM, E. V. (1940). **Histological Studies of the Tissues of Rats fed a Diet extremely Low in Phosphorus.**—*J. Nutrit.* **20.** 181–195.

An extensive histological study was made on rats which had been maintained for varying periods on a diet containing only 0·017% P, but which was adequate in all other respects. Both unrestricted and paired-fed controls were used. The main macroscopic changes noted in the deficient groups were roughness of coat, skeletal rarefaction, decrease in body fat, and decrease in size of thoracic cavity, but these differences were far less obvious in comparison with the paired-fed, as opposed to the unrestricted, controls. Histologically, many changes were noted in both P-deficient rats and paired-fed controls, and the only detectable microscopic lesions which could be attributed to P deficiency alone were skeletal rarefaction and accompanying rickets. The necessity of including paired-fed controls to differentiate between specific changes and those due to inanition is strongly emphasized.—ALASTAIR N. WORDEN.

SCHULTZE, M. O. (1941). **The Relation of Copper to Cytochrome Oxidase and Haemotopoietic Activity of the Bone Marrow of Rats.**—*J. biol. Chem.* **138.** 219–224.

Induced Cu deficiency in rats leads to a pronounced decrease of the cytochrome oxidase activity of the bone marrow, while subsequent Cu feeding is followed by an immediate increase in such activity, reaching a maximum within 24 hours. No effect on the cytochrome oxidase activity was noticed by feeding Fe, Co, or Mn in the absence of Cu. Normal rats respond to such haemopoietic stimuli as haemorrhage, low O_2 tension, and Co feeding, by a rapid increase in the cytochrome oxidase activity of the bone marrow, and there is a close relation between such activity of the marrow and its ability to form haemoglobin and erythrocytes.—ALFRED EDEN.

PUBLIC HEALTH

—. (1941). **Veterinarians and the Public Health.**—*Vet. Med.* **36.** 123.

It is stated that the position with regard to food inspection in the U.S.A. is unsatisfactory and that this work should be done by technically trained officials. In support of the view expressed it is stated that out of the 53 state and insular departments of health in the U.S.A., only six have milk control divisions and only in two of them is a veterinarian in charge. Twelve states have food and drug divisions, one being under veterinary control, the rest being under control of non-medical or non-veterinary persons. Two states have both food and drug and milk sanitation divisions, none being under veterinary control. Thus only three veterinarians hold administrative posts in public health departments of the states of the U.S.A.—J. E.

MESSNER, E. (1937). Cantidad de germenes en las leches producidas por glándulas

sanas. **[Bacterial Content of Milk from Healthy Udders].**—*An. Fac. Vet., Montevideo.* **3.** 11–40.

M. examined samples of milk from 376 quarters from udders considered clinically healthy. The average bacterial content proved to be 141 per c.c. Of the 376 quarters, three were apparently bacteria-free, although it is pointed out that bacterial growth might have occurred if larger quantities of milk had been used for culture; these samples, however, were the only ones obtained which could be considered as typical milk from an uninfected gland. All the other samples were typical of milk from a gland actively resisting bacterial invasion. In a previous paper M. gave a limit of 300 organisms per c.c. for healthy milk, but he now points out that this criterion can only be accepted on broad lines and that even 600 bacteria per c.c. may represent a state of "microbism" without necessarily indicating abnormality, unless the bacteria are definitely pathogenic. He considers that if repeated tests of a given milk show more than 300 bacteria per c.c. then a state of "microbism" exists even if mastitis is not evident. The state of "microbism" is on the borderline of disease.

Of the 376 samples, 50 had more than 300 organisms per c.c., but the greater part of these were from quarters adjacent to quarters which were definitely abnormal. Although the quarters are anatomically distinct, infection of one from another during milking, etc. must be taken into account. But of the 50 "high counters" only nine samples came from udders in which the four quarters were apparently normal. In other words, in 97·6% of the samples the criterion of 300 bacteria per c.c. as the maximal bacterial content of a normal gland was justified.

For an accurate diagnosis of mammary conditions, M. stresses the need for bacterial counts of milk in addition to clinical examination of the udder.—Miller Watson.

*Obuchow, P. F. (1939). **Brucella Organisms in Market Milk.**—*J. Microbiol., Moscou.* No. 7/8. pp. 94–98. [In Russian]. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **138.** 367].

About 17% of the total milk samples examined in the Perm area were shown to come from infected cattle. Agglutination tests on 1,644 persons yielded 4·7% positive reactions, whilst 0·9–1·5% were clinically affected with brucellosis.

Hadwen, S., & Gwatkin, R. (1939). **The Detection of Abnormal Cow's Milk by Microscopic Methods.**—*Canad. J. Res.* Sect. D. **17.** 225–244.

After discussing the significance of leucocytes in milk, the authors give the results of a comparison of sedimentation counts of cells found in milk and the method advocated by Breed (1929), *viz*, microscopical examination of stained smears prepared by spreading a stated amount of the sample on a stated amount of the slide. They adopted the former method as being more suited to their purpose. The establishment of a standard for normal milk was then attempted and after experimental study it was defined as milk free from (1) polymorphonuclear leucocytes and (2) micro-organisms. From a herd of 60 cows, nine of the younger animals met these requirements.

The absence of the causative organisms, which may occasionally occur, in stained smears of milk from cows with staphylococcal and streptococcal mastitis, will not hinder identification of the type of infection if there is familiarity with the cell picture in the two infections. Diagnosis of *Bacterium coli* or *Corynebacterium pyogenes* mastitis by microscopic examination of milk is not difficult as the causative micro-organisms in these infections appear in large numbers with extensive degenerative changes in leucocytes.

The technique employed is also adapted to the study of phagocytes and the identification of red blood corpuscles and chromatin granules. Like calcium calculi in the udder, the presence of r.b.c. may or may not be associated with diseased conditions, while phagocytosis aids in the estimation of the resistance to infection in the host. The chromatin granules are considered to be the result of degenerative changes in the polymorphonuclear leucocytes. Studies of colostrum were also made.—L. M. Heath.

THERAPEUTICS

Little, R. B., Dubos, R. J., & Hotchkiss, R. D. (1941). **Gramicidin, Novoxil, and Acriflavine for the Treatment of the Chronic Form of Streptococcic Mastitis.**—*J. Amer. vet. med. Ass.* **98.** 189–199.

The present report comprises (a) a discussion

of the site of infection in the chronic form of mastitis due to *Streptococcus agalactiae*, (b) methods of diagnosis, (c) selection of cases suitable for treatment, (d) a discussion of the bactericidal agents used in the treatment of udder infections, (e) protocols of the cases treated, and (f) methods of administration.

Three bactericidal agents, *viz*, gramicidin [see *V. B.* **11.** 475.], novoxil (a 5 or 10% preparation of pure oxide of silver in mineral oil), and acriflavine, were used in the treatment of 53 quarters of 21 cows. Of 32 quarters which received gramicidin, the streptococci were eliminated from 21 (65%), in 11 after a single treatment, while 10 required additional injections. Medication was ineffective in 11 quarters. Of 17 quarters injected with novoxil the streptococci were eliminated from 10 (58%). Only one quarter which was not treated with some other agent responded to a single treatment with novoxil. Of 7 quarters treated with acriflavine by infusion the streptococci were eliminated from 3 (42%).

The technique employed in treatment consisted either of infusions with comparatively large aqueous solutions of gramicidin and acriflavine or of injections of the agents suspended in a much smaller bulk of a heavy mineral oil (liquid paraffin). The authors are of the opinion that the oil suspensions were much less irritating than aqueous solutions, especially when gramicidin was used.

These observations agree with those of other workers [*V. B.* **9.** 43], *viz*, latent or mild cases of infection respond to chemotherapeutic treatment more readily than advanced cases.

—N. J. Scorgie.

Thompson, A. (1940). **M & B 693 in the Treatment of "Summer" or "Dry" Mastitis.**—*Vet. Rec.* **52.** 799–801.

Eleven cases of *Corynebacterium pyogenes* infection were treated with M & B 693. The first two cases were described as of a fulminating type; both animals died within 24 hours. The remaining nine cows all improved. In three animals which received early treatment, the quarters returned to normal. In the remainder the quarters varied; some induration usually resulted. Shorthorns received an initial dose of 75 g. and Ayrshires of 50 g. of M & B 693, followed by twice daily doses of 25 g.—R. F.

Bazeley, P. L. (1940). **Sulphanilamide Treatment of Streptococcal Infections in Horses.**—*Aust. vet. J.* **16.** 187–193.

Thirteen cases of severe haemolytic streptococcal infections in horses, *viz*, nasal catarrh, traumatic pleurisy, pneumonia, purpura, and strangles were treated with sulphanilamide. Administration by nasopharyngeal tube in doses indicated in earlier papers [*V. B.* **10.** 791, and **11.** 257.] was carried out. All except one case, in which improvement could hardly be expected, responded very well to the treatment, especially the more acute cases.

—W. I. B. Beveridge.

Dumaresq, J. A. (1940). **Effect of Sulphanilamide on *Brucella abortus* Infection in Guinea Pigs and Cows.**—*Aust. vet. J.* **16.** 102–107.

G. pigs were inoculated with *Br. abortus* and, after the infection was well established, were given an intensive course of sulphanilamide. It was considered that the drug exerted a marked retarding influence on the infections and cured some cases. M & B 693 did not appear to be any more effective than sulphanilamide.

Two naturally infected cows were given 1–2 oz. of sulphanilamide daily for 11–13 days. The cows showed some toxic symptoms. The agglutination titres were not altered and *Br. abortus* was later isolated from the udders of both.—W. I. B. Beveridge.

Toomey, J. A., & Roach, F. E. (1941). **Promin in the Treatment of Some Acute Infections.**—*J. Paediatr.* **18.** 1–5.

Promin [see *V. B.* **11.** 323.] had been found to be absorbed erratically and to cause cyanosis in a proportion of human patients when given *per os*; when given subcutaneously it caused irritation. These authors found, however, that when the drug was given intravenously the toxic effects were insignificant. They now report on the action of the drug after intravenous injection on 54 patients. It was less toxic than sulphanilamide and had a beneficial effect on streptococcic infections, especially those of the upper respiratory tract and erysipelas. It did not tend to produce crystals or concretions in the urinary tract.

Ogilvie, W. H. (1940). **Prevention and Treatment of Wound Infection. I. Treatment of Infected Wounds.**—*Lancet.* **238.** 608–610.

Whitby, L. E. H. (1940). **Prevention and Treatment of Wound Infection. II.**

Biological Aspect of Infected Wounds.—*Ibid.* 655–657.

CRUICKSHANK, R. (1940). **Prevention and Treatment of Wound Infection. III. Bacteriology of Infected Wounds.**—*Ibid.* 704–706 and 750–752.

GARROD, L. P. (1940). **Prevention and Treatment of Wound Infection. IV. Action of Antiseptics on Wounds.**—*Ibid.* 845–848.

BUTTLE, G. A. H. (1940). **Prevention and Treatment of Wound Infection. V. Chemotherapy of Infected Wounds.**—*Ibid.* 890–893.

OGILVIE, W. H. (1940). **Prevention and Treatment of Wound Infection. VI. Surgery of Infected Wounds.**—*Ibid.* 975–978 and 1019–1021.

I. In the last war three methods proved their worth in the treatment of infected wounds, namely (1) A combination of free drainage, abundant absorbent coverings, and complete immobilization in plaster of paris, (2) intermittent irrigation with hypochlorite solutions (Carrel), and (3) the use of " lymphagogues " *i.e.* hypertonic solutions of common salt or magnesium sulphate. Three post-war developments are of importance, *viz* (1) the appreciation that the majority of bacteria are harmless, and that few of the pathogenic bacteria, especially the streptococci, are dangerous in minimal quantities, (2) the introduction of the sulphonamide drugs which have marked bactericidal effects and little toxic action on the organism, and (3) the intensive study of the method of no dressings and prolonged immobilization in the treatment of established infections.

II. Except in fulminating infections, there is usually a lag of 5–12 hours between the time of wounding and the time when the implanted infection assumes a dominating position; this lag can doubtless be increased by prophylactic chemotherapy. After attention to the general condition, the surgeon can act by removing lacerated and devitalized tissue and by ensuring a good blood supply to the wound; immobilization of the part is then required. When the wound has become infected, attention should be paid to the general condition of the patient. Chemotherapy may be of value, though the sulphonamides are ineffective when pus is present. " Lymphagogues " are of value, but their continual use tends to cause local oedema.

III. The bacterial infections which principally attack wounds are (1) the pyogenic bacteria, especially *Streptococcus pyogenes*, *Staphylococcus aureus* and the coliform group, together with *Proteus vulgaris* and *Pseudomonas pyocyanea*, and (2) the sporing anaerobes, *viz*, *Clostridium welchii* Type A, *Cl. septique*, *Cl. oedematiens*, and *Cl. tetani*. Rarer organisms include *Corynebacterium diphtheriae* and *Fusiformis necrophorus*. The sporing anaerobes are most often carried into the wounds by infected soil. Too frequent dressings of wounds should be avoided, and an attempt should be made to keep " clean " and septic cases separated.

Autogenous vaccines may be of value in some streptococcal and staphylococcal infections and may be combined with chemotherapy. Antiserum may be of value in the prophylaxis of gas gangrene, and should be given intravenously in large doses in the treatment. It should also be injected as a " barrage " round the gangrenous area. Immunization with tetanus toxoid protects for at least two years. In all wounds prophylactic doses should be given.

IV. Antiseptics, especially the more potent ones, show a certain selectivity in their action, *e.g.* the acridine compounds exert their most powerful action on haemolytic streptococci. The antiseptic should, in general, be applied in aqueous solution and the use of other solvents usually entails loss of antiseptic power. In the prevention of sepsis in wounds adequate disinfectant power should be combined with minimal toxicity to tissues, so that no damage be done to tissue cells. This can be done only by the acridine dyes. The control of actively spreading infection is the sphere of chemotherapy with sulphonamides.

V. Chemotherapy will probably reduce the incidence of serious infections following wounds. Sulphanilamide, sulphapyridine, and sulphathiazole all have a rapid effect on streptococci, and sulphathiazole is possibly the most useful in staphylococcal infections. The drugs are more useful for prophylaxis than cure. Sulphanilamide should be given both by mouth and into the wound as soon as possible after wounding. The results obtained with sulphanilamide in cases of gas gangrene due to *Clostridium welchii* have been good.

VI. The modern principles of surgical treatment of wounds in the human subject are stated.—J. M. ROBSON.

GORDON, J., & MCLEOD, J. W. (1941).

Relative Value of Sulphonamides and Antisera in Experimental Gas Gangrene. —*Lancet*. **240**. 407–409.

Experimental evidence shows that antisera are very effective in the prophylaxis of gas gangrene, but of very little value for treatment. Multiple injections of serum into the muscle in the vicinity of the wound are recommended. The sulphonamides have only a limited value in the prophylaxis of gas gangrene, and local administration is more useful than oral. These drugs are not likely to be useful in treatment except in cases where there is a mixed infection with an aerobe susceptible to them.—J. M. R.

Dann, L., Glücksmann, A., & Tansley, K. (1941). **The Healing of Experimental Wounds Treated with Epicutan.**—*Brit. J. exp. Path.* **22**. 70–75.

In experimental wounds in rats epicutan (a sterile and stable extract of calf embryo absorbed on kaolin, manufactured by Lundbeck, Copenhagen) did not greatly affect the rate of decrease in wound area nor the rate of epithelialization. There was marked improvement of collagen and muscle regeneration in treated wounds. The effect of epicutan treatment was inferior to that of certain other treatments in general clinical use, *e.g.* cod liver oil and plaster of paris.—J. M. Robson.

—. (1941). **Discussion on Chemotherapy and Wound Infection.** [Speakers: Colebrook, L., Lewis, E. E., Mowlem, R., Fleming, A., Hawking, F., Green, C. A., Francis, A. E., & Wallersteiner, K.]—*Proc. R. Soc. Med.* **34**. 337–350.

Powdered sulphanilamide introduced into a wound will dissolve in the exudate, giving a nearly saturated solution which may be expected to check the growth of most bacterial species. Recently a large number of wounds, dusted daily with sulphanilamide powder, were observed. It seemed clear that, if there was not much exudate nor any pocket in which it could collect, haemolytic streptococci could usually be got rid of from such wounds within 3–4 days (Colebrook, Francis and Gillies).

Lewis has packed wounds with sulphanilamide giving also sulphapyridine orally; good results were obtained. Sulphanilamide was also applied to burns after cleaning, and covered with tulle gras.

Fleming stressed the fact that sulphathiazole has a more bacteriostatic action than sulphapyridine, which in turn is more potent than sulphanilamide. For this reason sulphathiazole acts not only on streptococci and pneumococci but also on staphylococci. The action of sulphonamides is inhibited by pus which limits their effectiveness. The bacteriostatic activity of penicillin compares favourably with that of the sulphonamides; moreover, the action of penicillin is not inhibited by pus fluids.

Hawking found that the local use of sulphonamides saved the life of g. pigs infected with gas gangrene, though little action was produced against *Clostridium oedematiens*. Sulphathiazole was the most effective compound. He has treated wounds containing thick pus with sulphathiazole and has found that the pus often becomes sterile.

Green found that prontosil did not interfere with antibody formation.

Wallensteiner has investigated the effect of various sulphonamides on the growth of fibroblasts *in vitro*.—J. M. Robson.

Reed, G. B., & Orr, J. H. (1941). **Chemotherapy in Experimental Gas Gangrene.** —*Lancet*. **240**. 376–380.

Characteristic gas gangrene has been produced in g. pigs by the introduction of very small numbers of *Clostridium welchii*, *Cl. septicum*, *Cl. sordellii* or *Cl. novyi* into wounds, together with a fragment of devitalized tissue and a trace of sterile soil containing calcium salts. These infections are controlled by the administration, in order of effectiveness, of sulphanilamide, sulphapyridine, sulphamethylthiazole, and sulphathiazole. The best results have been obtained when some of the drug was introduced directly into the wounds; purely oral administrations gave much less satisfactory results. When introduced into a wound, sulphanilamide and sulphthiazole produced a much higher concentration in the tissues surrounding the wound than in the blood. No safe dose of sulphanilamide given orally will produce as high a concentration in a wound as a moderate dose applied locally. —J. M. Robson.

Dorling, G. C., & Eckhoff, N. L. (1940). **Chemotherapy of Abdominal Actinomycosis.**—*Lancet*. **239**. 707–709.

Five cases of severe abdominal actinomycosis were treated with sulphanilamide, sulphapyradine, or both; four recovered completely and one died. In one case where deep X-rays

had also been used, a later operation showed that all evidence of the disease had disappeared. It is suggested that chemotherapy should be tried early in all cases of suspected abdominal actinomycosis and that two or three courses, each lasting a week and with a week between, be given.—J. M. Robson.

Kraneveld, F. C., & Mansjoer, M. (1940). Proeven over de werking van Congasin (Surfen C) tegen infecties met het Trypanosoma evansi. **[Value of Congasin in the Treatment of Surra].**—*Ned.-ind. Bl. Diergeneesk.* **52.** 203–221. [English and French summaries].

As naganol and arsocoll have sometimes proved unsatisfactory in the treatment of surra in the Dutch East Indies, the authors experimented with congasin (surfen C). Many investigators do not agree about the action of congasin on *T. congolense*, *T. vivax* and *T. pecorum*. Favourable reports were published by Hornby & Bailey (Tanganyika), Mettam & Carmichael (Uganda), by workers in the Kenya veterinary service (1934), by Evans (Sudan), Lester (Nigeria), van Saceghem & Delidimitriou (Belgian Congo), and by Bennett (Sudan), whilst unfavourable reports were published by Marshall (Nigeria), Stewart (Gold Coast), Danks & Daubney (Kenya), Bevan (Southern Rhodesia), le Roux (Northern Rhodesia) and van Rensburg (South Africa).

All these observers agree in using the intramuscular route of injection.

The authors carried out experiments with a strain of *T. evansi* (Batavia I) which was very sensitive to naganol in g. pigs, and to naganol-arsocoll in horses. Congasin proved to have an extremely weak prophylactic action and no curative effects against surra in g. pigs and to be far inferior to several other remedies, particularly naganol. The stronger dose, 40 mg. per kg. could be tolerated by healthy g. pigs, but caused the death of infected ones. 5 g. of congasin per week is near the lethal dose for a horse weighing 125 kg.—L. Tobback.

Browning, C. H., Browning, P., & Robb, J. V. M. (1940). **A Phenanthridinium Compound of Morgan and Walls as a Chemotherapeutic Agent in Experimental Infections with *T. congolense*.**—*J. Path. Bact.* **50.** 371–372.

The authors tested 7 amino-9 (*p*-aminophenyl)-10 methyl phenanthridinium chloride for its curative value in experimental infections in mice with two strains of *Trypanosoma congolense* of different virulence. Each animal was given a single subcutaneous injection of the drug, the maximum dose tolerated being 1 mg. per 20 g. body weight. The results obtained were :– (1) In infections with the less virulent strain, doses of 0·2–0·05 mg. cured all the animals treated ; 0·04–0·033 mg. cured 4 out of 6 mice ; 0·02–0·017 mg. cured 5 out of 6 mice ; 0·013–0·01 mg. cured 3 out of 3, and 0·007 mg. or less failed to cure 4 mice which received this dose. (2) In infections with the more virulent strain, 0·2 mg. cured 3 out of 3 treated mice ; 0·1 mg. cured 3 out of 4 mice ; 0·067–0·033 mg. cured 5 out of 5 mice, and 0·02–0·017 mg. cured 1 out of 4 mice.

The prophylactic action was slight, animals being susceptible to reinfection four days after injection of a large dose of the drug.

Olsen, M. W., & Allen, E. A. (1940). **Treatment of Cecal and Liver Trichomoniasis in Turkeys by Fever Therapy.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 875–876.

Twenty-four turkeys naturally infected with *T. gallinarum* were placed in a thermostatically controlled cabinet for periods of 1–2 hours. The internal body temperature of the bird was raised 2°–6° above the normal of 106·5°F. by maintaining within the cabinet an air temperature of approximately 104°F., and a relative humidity of 60–70% ; the duration of the experiment depended upon the physical condition of each bird and its ability to withstand the increased temperature. Usually three treatments at 48-hour intervals were sufficient to check the disease, although as many as six treatments were necessary in a few more advanced cases. Twenty of the birds recovered, while the other four failed to respond to treatment. Of nine turkeys affected with trichomoniasis, kept as controls under similar conditions, and fed rations identical with those of the treated birds, seven died and two recovered.

McPeek, R., & Armstrong, F. E. (1941). **Bovine Coccidiosis Treated with Sulfanilamide.**—*Vet. Med.* **36.** 199–201.

In a limited number of cases of *Eimeria zurnii* infection of calves, faecal counts varied from 1,700 to 87,000 oocysts per g., and clinical symptoms invariably accompanied a count of over 5,000 oocysts per g. Sulphanilamide was given in doses of 1 g. per 20 lb. body weight

per day, the daily dose being divided into two and given in capsules morning and evening. Faecal counts became negative and there was clinical improvement by the fifth day, when treatment was discontinued. Results were encouraging and appear to justify further research.—H. E. HARBOUR.

LENNOX, F. G., & HALL, D. L. (1940). **The Use of Oil of Citronella for the Protection of Lambs against Blowfly Strike.**—*J. Coun. sci. industr. Res. Aust.* **13.** 65–73.

A series of essential oils was tested for repellent properties by means of a special turntable. Citronella, coriander, lavender, petit grain, rosmarini, and rutae were found to be the most highly repellent. Citronella, being the cheapest of these, was chosen for further study in an insectary with a pure population of *Lucilia cuprina*. Areas on sheep were rendered susceptible by application of a plug of cotton wool soaked in a solution of indole and ammonium carbonate. Citronella in paraffin and as a 10% concentration in soap solution was shown to give good protection for several days. Limited trials were conducted to test the efficacy of the latter in preventing strikes of lamb-marking wounds. A significant, but not high, degree of protection was afforded.

—W. I. B. BEVERIDGE.

MCCULLOCH, R. N. (1940). **Observations on the Toxicity of some Insecticides as Stomach-Poisons to Blowfly Maggots.**—*J. Aust. Inst. agric. Sci.* **6.** 105–108.

Comparative tests were carried out on the toxicity to blowfly larvae of about 30 insecticides. Both lowest toxic concentration and rate of kill were determined. Arsenious oxide in solution or as calcium arsenate proved to be the best by both tests.—W. I. B. BEVERIDGE.

HOSKINS, W. M., BLOXHAM, H. P., & VAN ESS, M. W. (1940). **The Insecticidal Effects of Organic Compounds. 1. Toxicity of Sulphur and Nitrogen Compounds to Fleshfly Larvae.**—*J. econ. Ent.* **33.** 875–881.

The toxicity to larvae of *Lucilia sericata* of representatives from several series of organic compounds containing amino nitrogen or sulphur or both, was studied by adding each substance at various concentrations to a synthetic diet. The thioureas were found to be the most toxic of the groups tested.—W. MOORE.

SWALES, W. E. (1940). **The Use of Phenothiazine in Veterinary Parasitology.**—*Canad. J. comp. Med.* **4.** 333–341.

S. reviews the recent developments with this drug, with particular reference to its use in Canada. Full details for its dosage and employment are given. Its greatest value lies in the prevention of nodular disease [*Oesophagostomum columbianum* infestation], and the control of *Haemonchus* and trichostrongyles in sheep. Its dangers in horses are discussed, while it cannot yet be accepted as a standard ascaricide for pigs. It is valuable against *Heterakis* (and therefore may be effective against *Histomonas meleagridis* infection) in poultry.

—T. W. M. CAMERON.

BUSHLAND, R. C. (1940). **The Toxicity of Phenothiazine and Certain Related Compounds to Young Screwworms.**—*J. econ. Ent.* **33.** 666–669.

In a series of laboratory tests, phenothiazine and a number of related compounds were found to be toxic to the larvae of *Cochliomyia americana*. The minimum lethal concentration of phenothiazine was 0·03–0·05% [see also *V. B.* **11.** 640].—W. MOORE.

ERRINGTON, B. J. (1941). **Phenothiazine as an Equine Anthelmintic.**—*Vet. Med.* **36.** 188–193.

E. discusses a number of cases in which toxic symptoms occurred following administration of phenothiazine to horses, and advocates caution in dosing with this highly efficient anthelmintic. Manifestations were of anaemia, albuminuria, and haemoglobinuria; four cases of nephritis are mentioned, although it was not certain that these were directly due to the drug's action. Red blood cell counts showed a decrease of at least a million per cu. mm. in 28 out of 39 animals examined; in a few of these cases the degree of anaemia was severe. Haemoglobinuria was not seen in mature animals following single 30 g. doses. Albuminuria was most often produced in animals which had been previously dosed. One instance is cited which tended to show that some samples of the commercial product might be more toxic than others.

E. advises the use of 30 g. doses for animals the size of mature thoroughbreds; for immature horses of this type a dose of 15 g. is suggested as adequate. Dosage should never exceed 50 g. in any horse. There appeared to be no reason for fasting before administration

(many of the animals showing haemoglobinuria had been fasted prior to dosing). Animals showing a tendency to constipation might be given laxative feeds before dosing; the use of mineral oil at the time of dosing was of questionable value. Division of the dose over two successive days gave efficient results but did not appear to affect absorption. The question as to how soon a dose could be repeated remained to be settled. Age and pregnancy were factors which had to be considered in dosing.—H. E. HARBOUR.

I. GORDON, H. McL., & WHITTEN, L. K. (1940). **A Field Trial Comparing Phenothiazine, Tetrachlorethylene Emulsion, and Copper Sulphate and Nicotine Sulphate Mixture for the Treatment of Trichostrongylosis.**—*J. Coun. sci. industr. Res. Aust.* **13.** 81–85.

II. GORDON, H. McL. (1940). **Studies on Phenothiazine as an Anthelmintic. A Comparison of the Efficiency of Finely and Coarsely Ground Phenothiazine Against** *Oesophagostomum columbianum.* —*Ibid.* 85–86.

III. GORDON, H. McL., & LIPSON, M. (1940). **Preliminary Examination of the Anthelmintic Efficiency of Certain Compounds Related to Phenothiazine.** —*Ibid.* 173–177.

I. Phenothiazine in doses of 15 g. for lambs about five months old and weighing about 20 kg. was highly efficient against *Trichostrongylus* spp. and showed encouraging results against *Oesophagostomum venulosum* and *Chabertia ovina.* Tetrachlorethylene in doses of 3·5 ml. administered as an emulsion following a dose of copper sulphate was also highly effective against *Trichostrongylus* spp. The mixture of copper sulphate and nicotine sulphate usually prescribed against *Trichostrongylus* spp. gave very poor results. The possible reasons for this are briefly discussed.

II. A coarsely ground phenothiazine preparation, consisting of granules which passed through a sieve of 20 meshes to the inch, but not through one of 30 meshes to the inch, was less efficient than the usually prescribed preparation which is a finely ground, barely palpable powder. Much of the coarsely ground material was passed in the faeces.

III. None of the following drugs showed the combination of high anthelmintic efficiency and low toxicity characteristic of phenothiazine :– phenothiazone, diphenylamine, phenoxthine, thionol and phenarsazine chloride. The drugs were tested against *Haemonchus contortus* and *Oesophagostomum columbianum* in sheep.

GORDON, H. McL. (1940). **Treatment of Trichostrongylosis (Black Scour) with Copper Sulphate and Nicotine Sulphate.** —*J. Coun. sci. industr. Res. Aust.* **13.** 169–172.

This article is written to explain some results recently published by G. [see I in preceding group] indicating that copper sulphate and nicotine sulphate mixture failed to control trichostrongylosis in a high percentage of sheep. He explains that the sheep used in the test were the 1,200 poorest of a lot of 10,000 weaners, all of which had been treated 8–10 times with this drench. It is known that in certain sheep (about 12%), copper sulphate fails to ensure the passage of the drench to the abomasum. It is probable that nearly all the 1,200 used in this trial were such animals. They did, however, respond to treatment with a preliminary dose of copper sulphate followed by tetrachlorethylene, but in this instance the copper sulphate was used in 10% solution, instead of 2%, and it was given to them a few seconds before the active principle, instead of mixed with it.—W. I. B. BEVERIDGE.

I. SWALES, W. E. (1940). **Further Experiments on the Use of Phenothiazine as an Anthelmintic for Sheep.**—*Canad. J. Res.* Sect. D. **18.** 266–271.

II. SWALES, W. E., & COLLIER, H. B. (1940). **Studies on Effects and Excretion of Phenothiazine when Used as an Anthelmintic for Sheep.**—*Ibid.* 279–287.

I. S. has further developed his formula for disintegrating tablets, which now contain 80 pts. commercial phenothiazine, 8 pts. pulverized starch, 5 pts. sodium bicarbonate, 4 pts. tartartic acid, 2 pts. sodium choleate [taurocholate], and 1 pt. phenolphthalein (U.S.P.). Continued critical tests have shown its complete efficiency against *Ostertagia* and *Haemonchus* and have demonstrated that the technique employed by S. allows a significantly greater efficiency against *Oesophagostomum columbianum, Trichostrongylus,* and *Cooperia* than the drug given as powder mixed with feed or in capsules.

II. The authors, using young sheep and barren, pregnant, and lactating ewes, were able

to recover over 80% of an oral dose of phenothiazine from the faeces and urine in roughly equal amounts. Derivatives appeared in the blood and urine within half-an-hour of administration; the maximum concentration occurred after about six hours. Phenothiazine derivatives were excreted in the milk but this had no direct effect on the lamb. The milk turned pink on standing and there was a pronounced bacteriostatic effect. These experiments, in which phenothiazine was used in the form of disintegrating tablets, produced further evidence of the complete efficacy of the drug against *Ostertagia* spp.—T. W. M. CAMERON.

PARNELL, I. W. (1939). **Studies on the Bionomics and Control of the Bursate Nematodes of Horses and Sheep. VI. On the Lethal Effects of Some Nitrogenous Chemicals on the Free-Living Stages of Sclerostomes. VII. The Effect of Some Substances, Used in the Control of Farm and Household Pests, on the Free-Living Stages of Sclerostomes. VIII. Comparisons of the Lethal Effects of Some Chemicals Containing Sulphur on the Free-Living Stages of Sclerostomes.**—*Canad. J. Res.* Sect. D. **17.** 68–86 and 187–204; **18.** 371–394. [For previous parts, see *V. B.* **9.** 551].

VI. P. found that chloropicrin will sterilize about 2,300 times its own weight of faeces, aniline up to 900 times, calcium cyanide about 530 times, and pyridine about 400 times. The ammonium compounds sterilize only 50 or less times their own weight.

VII. P. studied some common insecticides and similar substances with regard to their effect on sclerostome larvae. *P-* and *o*-dichlorbenzene were found to sterilize 400 times their weight of faeces, sodium fluoride and silicofluoride about 150–300 times, and naphthalene about 270 times. The other substances tested had low efficiencies.

VIII. P. examined similarly a number of common chemicals containing sulphur. Potassium xanthogenate was found to sterilize 160 times its weight of faeces. The inorganic sulphates were comparatively inefficient, while sulphur not only had no lethal effect but, by controlling antagonistic factors, increased the chances of survival of the larvae.—T. W. M. C.

SWALES, W. E. (1939). **The Control of Stomach Worms in Sheep in Eastern Canada.**—*Publ. Dep. Agric. Can.* No. 639. pp. 7.

This is a bulletin for farmers. The drench recommended against *Haemonchus contortus* in sheep is 3 oz. copper sulphate, 2 fl. oz. 40% nicotine sulphate solution, 1 Imperial gal. rain or distilled water. The doses of the mixture are 2 fl. oz. for adults, and ½–1 fl. oz. for lambs. Animals in poor condition should receive less. All adult sheep should be drenched in the spring, the ewes ten days after lambing and again with the lambs when the latter are two months old. The lambs are dosed again every 40–45 days. All sheep should be dosed again in the autumn. The necessity of maintaining a good system of husbandry, pasture rotation, and good hygiene, is emphasised.—J. A. G.

LIPSON, M. (1940). **An Examination of the Urine of Sheep Dosed with Phenothiazine.**—*Aust. J. exp. Biol. med. Sci.* **18.** 269–272.

After sheep had been dosed with phenothiazine, about 10% of the drug was recovered in the urine within 26 hours. The red colour of the urine was found to be due in part to thionol, as other workers have shown, but also just as much to phenothiazone (an oxidation product of phenothiazine). These two substances are passed in the form of their leuco bases which are oxidized to the parent dyestuffs when the urine comes into contact with the air.

—W. I. B. BEVERIDGE.

SWALES, W. E. (1940). **Will Phenothiazine Cause Photosensitization in Sheep.**—*Canad. J. comp. Med.* **4.** 164–165.

S. shows that, contrary to the case in man, a photosensitization does not develop in sheep from the presence in the body of the derivatives of phenothiazine.—T. W. M. CAMERON.

DELAK, M. (1941). Djelovanje bijeloga luka (Allium sativum) na konjsku glistu (Parascaris equorum) in vitro. [**The *in vitro* Action of Garlic Juice on *P. equorum***].—*Jugoslov. vet. Glasn.* **21.** 1–12. [Abst. from German summary].

D. carried out *in vitro* tests on the longevity in the constant-temperature oven [temperature not given in summary], and on the physiological responses as recorded by the kymograph, of specimens of *P. equorum* immersed in various mixtures of Bunge's solution and freshly pressed garlic juice.

In solutions containing 1% and 2% garlic

juice, the worms survived 17 and 16 hours respectively. Higher concentrations induced a phase of excitation, which varied from 3 hours at 5% to 14·5 min. at 50%. This phase was followed by one of paralysis, terminating in death after a total exposure varying between 7 hours in 5%, 1 hour in 35–75%, and 30 min. in the undiluted juice.

D. concludes that the *in vitro* action of garlic juice on *P. equorum* may be stimulating or paralysing, depending on the concentration and time of exposure. Similar experiments with garlic infusion or decoction, in place of the freshly pressed juice, showed that the latter had much the strongest action.

GORDON, H. McL. (1940). **The Anthelmintic Efficiency of Lentin (Merck) against *Oesophagostomum columbianum*.**—*J. Coun. sci. industr. Res. Aust.* **13.** 87–90.

Lentin (Merck) (amino-formyl-β-hydroxyethyl-trimethyl-ammonium chloride) in doses exceeding those recommended by the manufacturers was an inefficient anthelmintic against *O. columbianum*, *Haemonchus contortus*, or *Trichuris ovis* [see also *V. B.* **10.** 875]. The use of this drug was attended with fatal toxic effects; six of the 22 sheep died and a seventh recovered after administration of atropine.

FAURE, L. (1939–40). Traitement des helminthiases équines par le pétrole. [**Treatment of Helminthiasis of Horses with Petroleum**].—*Ann. Parasit. hum. comp.* **17.** 590–592.

F. recommends the use of petroleum [presumably unrefined] as an anthelmintic for military horses. Treatment comprised administration of 0·5–0·7 c.c. per kg. body weight in three daily doses after 36 hours fasting. The dose was given in ground-nut oil, which was replaced on the third day by castor oil followed by water. The treatment was well tolerated and was very effective against ascarids, oxyurids, and redworms. One horse, which received a total dose of 240 g., showed no untoward symptoms beyond dull colic and uneasiness, and expelled more than 1,100 ascarids in one night.
—M. L. BINGHAM.

VOGELSANG, E. G., & ALVAREZ, R. J. (1939). La esencia de frementina intravenosa en el tratamiento de la encefalo-mielitis de los equinos. [**Treatment of Equine Encephalomyelitis by Turpentine given Intravenously**].—*Rev. Med. vet. Parasit., Caracas.* **1.** 68–71.

The authors treated a number of horses affected with E.E. with turpentine in 10 c.c. and 20 c.c. doses repeated daily. The turpentine was chemically pure, fresh, and unoxidized and the injection was given, very slowly, intravenously. They claim excellent results for this treatment, many horses recovering after only two doses.—MILLER WATSON.

THOMSON, D., CLAYTON, W., & HOWARD, A. J. (1941). **Physical Chemistry of Oils in the Treatment of Burns.**—*Lancet.* **240.** 341–343.

Oil forms an insoluble film by a physico-chemical coagulation process when it comes in contact with an albuminous fluid. It is suggested that this should be used in the treatment of burns; it will check loss of serum and keep tissues supple (unlike tannic acid) and will counteract the possible bad effects of continuous immersion in saline. The properties of the membrane formed in contact with oils and protein solutions are discussed. Finally, a few experiments on rabbits suggest that burns heal more rapidly when treated with carron oil or cod liver oil than when treated with tannic acid.
—J. M. ROBSON.

ALBERT, A., RUBBO, S. D., & GOLDACRE, R. (1941). **Correlation of Basicity and Antiseptic Action in an Acridine Series.**—*Nature, Lond.* **147.** 332–333.

The strengths as bases of mono-amino-acridine and di-aminoacridine compounds were determined by potentiometric titration. The antiseptic activity of these compounds was determined against *Streptococcus pyogenes*, *Staphylococcus aureus*, *Clostridium welchii*, *Bacterium coli* and *Proteus vulgaris*. A remarkable correlation between the strength of the compounds as bases and their antiseptic activity was found, the one increasing with the other.
—J. M. ROBSON.

MACKAY, M. E. (1941). **The Bacteriostatic Effect of Disinfectants in Human Serum and Citrated Pasma.**—*Brit. med. J.* May 17th. 747–750.

The effect has been studied of various disinfectants (proflavine, phenyl mercuric nitrate and acetate, metaphen, sulphanilamide) in con-

trolling the growth of bacteria (*Bacillus subtilis*, *Staphylococcus aureus*, and enterococcus) in dried and reconstituted serum and in citrated plasma. The most satisfactory results were obtained with proflavine and phenyl mercuric nitrate, and indicate that proflavine 1 : 100,000 and phenyl mercuric nitrate 1 : 50,000 will prevent bacterial growth for three days. *Pseudomonas pyocyanea* was not inhibited by any of the disinfectants. Thymol and *p*-chlor-*m*-cresol were ineffective as bacteriostatics. Moulds were inhibited by 1 : 50,000 phenyl mercuric nitrate but not by 1 : 10,000 proflavine.—J. M. Robson.

Curran, H. R., Evans, F. R., & Leviton, A. (1940). **The Sporicidal Action of Hydrogen Peroxide and the Use of Crystalline Catalase to Dissipate Residual Peroxide.**—*J. Bact.* **40.** 423–434.

In studies of the germicidal activity of H_2O_2, purified crystalline catalase was used to destroy residual peroxide. The rate of killing of spores at pH 6·9 and 50°C. follows closely the unimolecular law for chemical reactions. The sporicidal activity of H_2O_2 is affected by pH largely through the effect upon its chemical stability, activity decreasing with increasing pH. Over the range 40°–70°C. at pH 6·9 the time required for the destruction of 50% of the spores by 1% H_2O_2 decreases from one-half to one-third for each 10% rise in temperature, and the time for total destruction of the spores over this range of temperature decreases with each 10°C. rise. The spores of some species cannot be totally destroyed by this treatment over this temperature range. The time required for destruction of spores by H_2O_2 increases as the spore concentration is increased and decreases with increase in H_2O_2 concentration. Complete destruction of spores even at high concentrations of H_2O_2 requires appreciable time.

Milk sterilized by H_2O_2 supports the growth of *Bacterium coli*, *Pseudomonas aeruginosa* and *Alcaligenes bookeri*, but retards that of *Streptococcus lactis*, probably due to the increased oxidation-reduction potential of the treated milk. Milk sterilized by H_2O_2 has the same appearance and odour as raw milk, and its flavour is only slightly inferior if the treated milk is heated at 80°C. for 15 min. immediately after peroxide treatment; on long standing, however, such milk develops an objectionable oxidized flavour.—Alfred Eden.

de Blieck, L., & Jansen, J. (1939). Het desinfecteerend vermogen van citopogeen ten opzichte van gonococcen en Brucella abortus. [**Disinfectant Action of "Citopogeen" on *Br. abortus***].—*Tijdschr. Diergeneesk.* **66.** 1208–1214. [English, French and German summaries].

The authors have tested the bactericidal action of "citopogeen" (a mixture of ethereal oils, naphthalene derivatives, soap, and alcohol) on gonococci and on *Br. abortus*. A solution of 1–3% killed a gonococcus culture within 2 min. A 10% solution killed three out of four strains of *Br. abortus* after 2 min.

"Therapogeen" [composition not traced] and carbolic acid had a weaker action. Staphylococci were not as quickly killed by citopogeen as were streptococci.—L. Tobback.

Lockemann, G., Bär, F., & Totzeck, W. (1941). Ueber die keimtötende Wirking von Alkoholen. [**Bactericidal Action of Alcohols**].—*Zbl. Bakt. I.* (*Orig.*). **147.** 1–15.

Anhydrous ethyl alcohol is without effect against most bacteria but has a bactericidal action on streptococci and *Pseudomonas pyocanea*. Methyl alcohol is bactericidal in the absence of water. Propyl and isopropyl alcohols are most effective in concentrations of 20–90%. *Staphylococcus aureus* and *Staph. albus* are highly resistant against these alcohols. Anhydrous alcohols dissolved in benzene have a bactericidal action.—J. M. Robson.

Tanaka, U., & Ohkubo, Y. (1940). **Pharmacological Studies on the Autonomic Nerves of the Small Intestine of the Horse. I. Sympathetic Innervation of the Small Intestine.**—*Jap. J. vet. Sci.* **2.** 321–339. [In Japanese: abst. from English summary].

Investigation of the action of adrenalin was carried out on various parts of isolated preparations of small intestine. It is claimed that the results indicate that increased tone in response to adrenalin is caused by motor fibres of sympathetic nerves, and decreased tone by inhibitory fibres. Also since any part of the small intestine of the horse produces contractile response to adrenalin, it seems evident that the sympathetic motor fibres innervate the whole range of the small intestine.

POISONS AND POISONING

Byers, H. G., & Lakin, H. W. (1939). **Selenium in Canada.**—*Canad. J. Res.* Sect. B. **17.** 364–369.

Analysis of about 300 samples of shales, soils, and "indicator" plants from 90 widely separated locations within the provinces of Manitoba, Saskatchewan, and Alberta indicated a selenium content of 0·3–3 p.p.m. for shales, 0·1–6 p.p.m. for soils, and 3–4,190 p.p.m. for vegetation. Although definite evidence of injury to livestock was apparent, the authors do not consider, from their present study, that special remedial measures are necessary, except the avoidance of overgrazing.—L. M. Heath.

Couch, J. F. (1941). **Trembles (Milk Sickness) Produced by Toxic Butter.**—*Vet. Med.* **36.** 244–245.

A sheep weighing 33·6 kg., was dosed over a three-day period with the equivalent of 225 g. of a butter made from milk of cows fed on rayless goldenrod (*Aplopappus heterophyllus*) and suspected of causing human cases of "milk sickness" in the locality concerned. After a few days characteristic symptoms of "trembles" developed. The butter was then examined chemically for the presence of tremetol which was thought to be the toxic component. The various fractions were tested for toxicity to mice. The results showed that the toxic substance secreted in the milk of cows that have fed on rayless goldenrod or on white snakeroot was not tremetol itself but some acid derivative of it, and it is therefore concluded that it must be converted *in vivo* to the acid substance responsible for toxicity.—Alastair N. Worden.

—. (1940). **War-time Protection for Animals in Rural Areas.**—*Vet. Rec.* **52.** 208–211.

The Chief Executive Officer of the National A.R.P. for Animals Committee gave the objects of the Air Raid Precautions for Animals National Committee which are:—the prevention and alleviation of animal suffering; the protection of human beings from panic-stricken or gas-contaminated animals; the conservation of animals of economic importance, living or dead; the protection of food supplies for essential animals, and the giving of general information and advice to animal owners. He described how these services are being organized, with special reference to farm stock. Measures to be taken include the protection of animals against injuries and gas, their treatment and decontamination, the salvaging of carcasses for food, the decontamination of animal foods, and the wartime feeding and treatment of small animals.—R. Fisher.

—. (1941). **Food and its Protection against Gas. The Conservation of Food is Second only to the Preservation of Life.** pp. 15. London: H.M. Stat. Off. [8vo] [3d.]

This pamphlet, issued by the Ministry of Food, gives a concise account of the dangers of gas contamination, of simple protective measures, and of the proceedings which will be followed by the authorities to protect the public against dangers arising from food that has been in contact with poison gas. Although gas attacks involving vapour concentrations sufficient to affect the human population may have little effect on food, grass contamination in the vicinity of an exploded gas-bomb or successful spraying by low-flying aircraft can render exposed foods unfit for consumption. Discussion of the general character of protective measures is followed by specific reference to growing crops, farm foods, livestock, bulk stores in warehouses, docks, shops, hotels, and institutions. Food and livestock in markets and domestic protection in private households are also considered. With regard to decontamination it is emphasized that this is an expert task which should always be left to the local authorities and A.R.P. personnel.—H. H. Green.

I. Klarenbeek, A. (1939). Dierenarts en luchtbescherming. **[Veterinary Work in Connexion with Air Raids].**—*Tijdschr. Diergeneesk.* **66.** 873–876.

II. Klarenbeek, A. (1939). Opmerking betreffende de bescherming van waren tegen oorlogsgas. **[Protection against War Gas].**—*Ibid.* 1006–1007.

III. Klarenbeek, A. (1939). De betekenis der chemische strijdmiddelen voor den dierenarts. **[Veterinary Aspects of Chemical War Gases].**—*Ibid.* 1147–1165.

I. K. briefly discusses the risk to animals in gas raids, the possibility of individual protection of animals and of gas-proofing stalls, the public part which the veterinarian can play educationally and administratively, and the extent to

which veterinary associations and institutes can assist by organizing educational courses and by arranging for gas detection and for decontamination of animals, animal foods, and meat.

II. A note on commercial grades of gas-proof coverings of the cellophane type.

III. A general survey of war gases and of protection against them, written along lines which have now become orthodox. Decontamination of animal foods, of human foods of animal origin, of water, and of stalls is dealt with.—H. H. Green.

PHYSIOLOGY

Mainzer, G. (1939). Ein Beitrag zur Morphologie der Milchgänge des Rindes. [**A Contribution to the Morphology of the Lactiferous Ducts of the Cow**].—*Z. mikr.-anat. Forsch.* **45.** 443–460. [Abst. from author's summary].

1. The epithelium of the large milk ducts is always in two layers, the basal layer being weaker than the surface layer. 2. Small intra- and inter-lobular milk ducts have a single layered epithelium morphologically similar to the surface layer in the big ducts. 3. It appears that the epithelium of the big ducts is secretory to a small extent, although no signs of this were seen in some udders. 4. The milk ducts possess a supporting structure, the propria, on which the epithelium lies. The propria consists of collagenous connective tissue which is traversed by elastic and muscular fibres and by vessels. Connective tissue and elastic fibres are present in the walls of the smallest ducts and of the glandular alveoli. 5. The muscular tissue runs in a circular as well as in a longitudinal direction in the walls of the milk ducts in such a way as to regulate the passage of milk.

Kwong, F. J. (1940). **Histological Study of the Mammary Gland of the Cow During Pregnancy.**—*J. Amer. vet. med. Ass.* **96.** 36–40.

The udders used for these experiments were from pregnant heifers and cows. Non-pregnant animals were used as controls. Development up to the third month was restricted to proliferation of ducts and atrophy of fat cells. At this stage the ducts were noticed to be aggregated into groups. From 4–7 months the alveoli were in the active stage of formation and they increased in size, becoming distended with secretion, up to full time. K. believes that the external layer of the duct epithelium is the progenitor of the perialveolar cell which is actively engaged in the mechanism of milk secretion. Udders of pregnant cows and non-pregnant lactating cows showed a well developed alveolar system.—C. W. Ottaway.

Emmerson, M. A. (1941). **Studies on the Macroscopic Anatomy of the Bovine Udder and Teat.**—*Vet. Ext. Quart. Univ. Pa.* **41.** No. 9. 3–18.

The majority of the small superficial lymph vessels of the teat wall anastomose with vessels on the lateral aspect of the udder and proceed postero-dorsally to enter the supramammary lymph nodes. The deeper vessels from the spaces in the glandular tissue and milk-collecting tubules are satellites of the blood vessels and also pass to the supramammary l.nn. which are situated above the udder, behind and level with the external inguinal ring. Two are usually present on each side; they are 3–4 in. long and kidney shaped. Their afferent vessels pass through the inguinal canal to the deep inguinal l.nn. A few mammary vessels drain into the prefemoral l.nn.

The nerves arise from the ventral divisions of the lumbars. The deep branches pass through the inguinal canal and are distributed throughout the glandular tissue. The sympathetic fibres originate from the posterior mesenteric plexus and are presumably incorporated with the inguinal nerves. Superficial blood vessels penetrate the abdominal musculature and ramify under the skin of the udder. [It would probably be easier to say that the supramammary l.n. is situated midway between the lower commisure of the vulva and the base of the two posterior quarters.]—C. W. O.

Dougherty, R. W. (1941). **In Vivo Determinations of the Hydrogen Ion Concentration of the Vaginas of Dairy Cows.**—*N. Amer. Vet.* **22.** 216–219.

An extensive study was made, involving 400 animals from 15 herds. A glass electrode was employed, and was specially constructed so that it could be introduced into the anterior vagina. A considerable variation in reaction was recorded. Thus in about 5% of the animals the pH values were between 5·5 and 6·0, 29% were between 6·0 and 6·5, 45% between 6·5 and 7·0, 20% between 7·0 and 7·5, and rather

less than 20% were between 7·5 and 8·0. There was no correlation between the individual values obtained and breeding disorders.—A. N. W.

SMITH, S. E., & ASDELL, S. A. (1941). **The pH of Vaginal Mucus of Normal and Sterile Dairy Cows.**—*Amer. J. vet. Res.* **2.** 167–174.

By means of the glass electrode method, a study was made of the reaction of samples of mucus obtained manually from the vaginas of both normal and functionally sterile dairy cows. In all but two of a total of 30 animals, the pH value lay between 7·0 and 8·9 and was of similar distribution in both normal and functionally sterile animals. (A cow with a discharging pyometra had a value of under 7·0). A fall in the pH was noted to occur immediately after oestrus, but the values obtained did not drop below 7·0 in any of the cases studied. A slight fall likewise resulted from the injection of an oestrogenic hormone preparation, but again values below 7·0 were not recorded, and the results were far less striking than those which have been obtained in women and macaque monkeys.

The pH of the cervical mucus averaged 6·8 in the four cases studied. This relationship of cervical to vaginal pH is the reverse of that occurring in women and monkeys, but is in agreement with values obtained in bovines by older methods adopted in this country some years ago.

The value of douching cows with sodium bicarbonate prior to service is questioned.

—ALASTAIR N. WORDEN.

BREWSTER, J. E., & COLE, C. L. (1941). **The Time of Ovulation in Cattle.**—*J. Dairy Sci.* **24.** 111–115.

Experiments were conducted with a total of 47 beef and dairy cattle of various breeds. At oestrus, each animal was confined to a barn, and mated at two-hourly intervals until she failed to accept. The end of oestrus having thus been determined, the time of subsequent ovulation was noted by rectal palpation conducted at two-hourly intervals. In 73 examinations, 70 ovulations were recorded, but in 17 instances the exact time of ovulation was not determined satisfactorily. The average time of ovulation in the remaining 53 cases was 13·57 ± 0·68 hours from the end of oestrus, and 67% of all ovulations occurred between 8 and 16 hours. In three instances only did the interval exceed 24 hours. One animal ovulated twice, from the left ovary after 11 hours and from the right after 16 hours. These and a number of other instances were checked by P.M. examination. The differences between the various breeds were not significant, but statistical analysis revealed that the average difference of 3·04 hours between heifers (which required less time) and cows which had previously calved was significant. There was exactly the same number of ovulations from right and left ovaries.—ALASTAIR N. WORDEN.

ANDERSON, J. (1941). **Report on the Biological Urine Test for the Diagnosis of Pregnancy in the Mare.**—*Vet. Rec.* **53.** 251–252.

The essential feature in the diagnosis of pregnancy in the mare by this test is the demonstration of at least 1,100 M.U. of oestrogens per litre of urine in the period up to 100 days after the last service [see also *V. B.* **7.** 88]. In Kenya over the period 1936–40 the accuracy obtained with the test was high. Only four mares out of a total of 343 were incorrectly diagnosed, all the errors being in mares which were subsequently shown to be barren. The period of pregnancy at which the diagnostic concentration of oestrogens occurred varied considerably, but it rarely occurred before the 50th day of pregnancy. A.'s data show that specimens for routine diagnosis should not be submitted before 60 days after the last service. Even from the 51st–80th day, about one-third of the pregnant mares required re-tests. After the 91st day a re-test in a pregnant mare was exceptional.—N. J. SCORGIE.

RUNGE, S. (1939). Wartość wczesnego rozpoznawania ciąży u krów za pomocą chemicznego badania włosów metoda kosiakowa. [**The Value of Kosiakow's Pregnancy Test (Chemical Analysis of Hair) in the Cow**].—*Wiad. weteryn.* **18.** 245–253. [Translation of German summary].

Kosiakow's reaction is not specific in the diagnosis of pregnancy in cows. Only further research can show what factors exert a favourable or unfavourable influence on the results of the reaction.

ARENAS, N., & SAMMARTINO, R. (1939). Le cycle sexuel de la chienne. Étude histologique. [**Sexual Cycle of the Bitch : Histological Study**].—*Bull. Histol. Tech. micr.* **16.** 229–259.

The authors describe a histological study of the genitalia of 30 bitches at different phases of the sexual cycle. Reviewing the terminology used by different workers, they point out that the terms first proposed by HEAPE (1900), *viz*, anoestrus, pro-oestrus, oestrus, and metoestrus, for the different phases of the cycle have been used in different senses by different authors. To eliminate ambiguity the present authors divide the cycle into four phases which bear a precise relation to ovarian activity, *viz*, (1) period of ovarian inactivity (anoestrus), (2) follicular maturation, (3) ripening of corpora lutea or phase of luteinization, and (4) regression. The histological picture in the ovary, fallopian tube, uterus, and vagina during these four phases is described and illustrated in a series of photographic plates. The authors also describe the histology during gestation and subsequent *post-partum* involution. The findings do not differ substantially from those already described by previous authors. Contrary to the observation of EVANS and COLE (1931), true cornification was not observed in the vaginal epithelium during the phase of luteinization. Observations were also made on the secretory activity of the uterine and vaginal cells during the four phases of the cycle.
—N. J. SCORGIE.

KOCH, W. (1939). Das Laktationshormon. **[The Lactation Hormone].**—*Dtsch. tierärztl. Wschr.* **47.** 741–743.

Oestrin stimulates the growth of the mammary gland but inhibits its secretory activity. Towards the end of pregnancy the lactation hormone (prolactin) is secreted by the anterior pituitary, but its effects are inhibited by oestrin. The action on the crop gland of the pigeon has been extensively used to investigate the action of prolactin. In mammals prolactin stimulates milk secretion in the mammary gland which has been subjected to the action of oestrin. Prolactin also produced broodiness in hens, stimulated nest building, and also stimulated the maternal instinct in mammals. Prolactin is at present very expensive and hence not usable in practice.—J. M. ROBSON.

HELLER, H. (1941). **Multiplicity of Pituitary Hormones. [Correspondence].**—*Nature, Lond.* **147.** 178.

The question is discussed whether the various types of anterior and posterior pituitary cells are able to secrete every activity (for which a pituitary hormone has been described) singly, or whether their secretion consists of large molecules with multiple activity, the action of which depends on the response of the effector tissue. Two possible experimental approaches to the problem are described.—J. M. ROBSON.

TAYLOR, L. W., & BURMESTER, B. R. (1940). **Effect of Thyroidectomy on Production, Quality, and Composition of Chicken Eggs.**—*Poult. Sci.* **19.** 326–331.

These experiments show that extirpation of the thyroid reduces egg-production to one-third of the normal rate. The size of the egg and the amount of shell is also reduced. The effect on composition is not conclusive. In incompletely thyroidectomized birds the average production was two-thirds. This proportion is similar to that of thyroidectomized birds given injections of thyroxin.—C. W. OTTAWAY.

FITZGERALD, T. C. (1940). **The Renal Circulation of Domestic Animals.**—*Amer. J. vet. Res.* **1.** 89–95.

F. describes in detail a corrosion method for demonstrating and preparing permanent anatomical casts of the blood-vascular system of the kidney. The technique involves the injection of a vinyl resin under controlled pressure into the blood vessels after preliminary washing and drying of these structures. By adding dyes of different colours to the resin, structural differentiation of the arterial and venous systems can be demonstrated. The prepared specimens may be kept indefinitely in the dry state. The same technique can also be used for demonstrating the circulatory system of other organs. F. claims that better specimens are obtained with this method than with the celluloid injection method. Some of the main features of the renal circulatory system in domesticated animals are described.
—N. J. SCORGIE.

TECHNIQUE AND APPARATUS

RICHARDS, O. W. (1941). **The Staining of Acid-Fast Tubercle Bacteria.**—*Science.* **93.** 190.

Mycolic acid, which is the only acid-fast compound yet isolated from tubercle bacilli, was melted on slides and stained in carbol-auramin and in carbol-fuchsin. The auramin stained the mycolic acid intensely yellow and

the combination resisted decolourization in acid alcohol even after three days and nights of exposure. The mycolic acid was stained with difficulty by the carbol-fuchsin and easily decolourized in acid alcohol. It was shown that mycolic acid is not strongly acid-fast to fuchsin. Although the acid is weakly fluorescent when exposed to ultra violet light, an intensely bright yellow fluorescence is observed when it is stained with carbol-auramin. These findings suggest that mycolic acid is the acid-fast constituent of *Mycobact. tuberculosis* and explain why more bacteria are revealed in microscopic preparations by a fluorescence technique than by the usual Ziehl-Neelsen staining method.—K. C. SELLERS.

CROSSMON, G. (1940). **The Selective Staining of Red Blood Cells.**—*Stain Tech.* **15.** 155–158.

A technique, using the dye chromotrope 2R, is described. Fixation is obtained in 10% neutral formalin in 0·85% NaCl, after which several washes of 70% ethyl alcohol are used. After dehydration the material is embedded in paraffin or celloidin and sections are cut at from 6–10μ, and mounted. The sections are stained in chromotrope 2R (Grübler or National Aniline Co.), 0·25 g. in 100 c.c. distilled water + 1 c.c. glacial acetic acid, for 1–5 min. The sections are rinsed in changes of distilled water until dye no longer colours the water; they are then transferred to 5% phosphotungstic acid in 95% ethyl alcohol until microscopic examination shows that all tissue elements, other than red cells, are decolourized. They are next stained in methyl blue [cotton blue] for 2–5 min., rinsed in distilled water and transferred, for about 1 min., to 2% glacial acetic acid. This process of differentiation should result in red erythrocytes, colourless or grey less strongly acidophilic elements, and blue basophilic elements. Several changes of absolute ethyl alcohol followed by several changes of xylol and mounting in balsam complete the preparation. Simplification of the technique by omitting methyl blue shows red erythrocytes on a colourless background. A nuclear stain may be used before staining and C. recommends freshly prepared Weigert's iron haematoxylin for this purpose.—C. H. S.

LILLIE, R. D. (1940). **Acid Fuchsin as a Connective Tissue Stain after Phosphomolybdotungstic Mordanting.**—*Stain Tech.* **15.** 159–165.

Some samples of acid fuchsin were found to be incapable of staining connective tissue deep red after phosphomolybdic-phosphotungstic acid mordanting by a modified Masson technique. Sulphonation of basic fuchsin by the mixture of 3·5–4 pts. of 25–30% fuming sulphuric acid to 1 pt. of dye at 65°–70°C. for 30 min. produced an acid fuchsin which gave satisfactory results. Concentrated and 15% fuming H_2SO_4 used in the same proportions also gave good results. A higher proportion of H_2SO_4 (5–7·5 pts. of acid) used at temperature ranges of 50°–130°C., gave unsatisfactory results on account of over-sulphonation.

The spectrophotometric examination of two different samples of acid fuchsin showed a maximum absorption at 540–550 mμ wavelength in both samples; no spectrophotometric criteria could be found which would separate the satisfactory from the unsatisfactory acid fuchsins.—E. C. HULSE.

VON KLOBUSITZKY, D. (1939). Theoretische und praktische Grundlagen der Herstellung von konzentrierten Immunsera. **[Theoretical and Practical Principles for the Preparation of Concentrated Immune Sera].**—*Ergebn. Hyg. Bakt.* **22.** 238–307.

An account of the chemical and physical properties of the protein fractions of serum is given, and the many techniques employed in practice for the concentration of the fractions containing antibodies are dealt with in considerable detail, *viz*, precipitation by salting, electrical methods, ultrafiltration, drying, and adsorption.

The article is made especially valuable by the large number of references given.—H. H. S.

ANON. (1941). **The Extraction of Antigens by Sound Waves.**—*Science.* **93.** Feb. 21st. Suppl. p. 10.

A note on the method by which antigens are extracted from bacteria by the purely physical or mechanical action of high pitched sound waves approximating the ultrasonic range. The apparatus consists of a magnetized metal tube which is caused to vibrate very rapidly by passing an alternating electric current round it in coils. The bacterial suspension is poured into a chamber formed by tightly attaching a glass tube to the upper end of the metal tube. After the process has continued long enough to extract most of the antigens, the liquid is

centrifuged and filtered. The remaining clear bacteria-free liquid containing the antigens is frozen immediately and the water evaporated out of the ice; the solid, dried residue can be kept for a year or more. Immediate freezing is necessary as some types of antigens are extremely unstable at temperatures a little above freezing point.—R. ALLCROFT.

JENNISON, M. W., & WADSWORTH, G. P. (1940). **Evaluation of the Errors Involved in Estimating Bacterial Numbers by the Plating Method.**—*J. Bact.* **39.** 389–397.

In estimating bacterial numbers by the plating method the total error is the result principally of the distribution error (in the actual plate count) and of the dilution error (due to pipettes etc.). An expression is derived for evaluating the dilution error, assuming deviations in pipettes and dilution blanks to be known. From this a table has been prepared of dilution errors (as percentage standard deviations) for all combinations of dilution blanks and for various deviations in blanks and pipettes. The usual method by which the distribution error can be calculated is briefly outlined and from this error and the dilution error (read from the table) a formula is given by which the total error can be calculated. An illustration is given of the actual method for evaluating the total error.—ALFRED EDEN.

MISCELLANEOUS

CAMERON, A. E. (1940). **The Relation Between the Health of Animals Division and the Practitioner.**—*Canad. J. comp. Med.* **4.** 33–35.

A review of the functions of the H. of A. Division of the Department of Agriculture, Canada, which has over 700 employees. The Division is connected, either directly or indirectly, with over 50% of the veterinarians in Canada. Attention is drawn to the fact that there are always strong forces in favour of State ownership and State supervision, but neither is without disadvantages and the extent to which this type of control is desirable should receive careful consideration. The practitioner and the government veterinarian are complementary and together may be of inestimable value to the country.—R. GWATKIN.

BUTLER, W. J. (1941). **Veterinary Service of a State.**—*J. Amer. vet. med. Ass.* **98.** 103–109.

The article outlines a plan for the organization of the veterinary service of a state in the U.S.A. —H. V. HUGHES.

—. (1939). **[Report of Committee on] Public Relations [American Veterinary Medical Association].**—*J. Amer. vet. med. Ass.* **95.** 579–597.

The committee submits a number of projects with the object of educating the public to a better appreciation of the significance of veterinary medicine. One of these is the proposed publication of a popular monthly magazine to be edited and supervised by representatives of the A.V.M.A. Details of a publicity programme are given. This suggests that the association should prepare material, which would be made available to the public press and to radio stations, giving information regarding the activities of the association and the profession generally. The committee is studying the State Veterinary Practice Acts, the majority of which, enacted between 1895 and 1910, are not applicable to present conditions. A number of essential provisions of a veterinary practice Act are mentioned, including the following:– that the purpose of the Act is to protect the livestock industry and the general public; that there will be included under veterinary practice (a) all measures for the prevention of disease in animals, (b) the diagnosis of animal diseases, (c) all treatment of the diseases of animals, and (d) all surgical operations upon animals; that there will be included under veterinary practice such part of meat inspection as depends upon the recognition of disease or disease process in animals or in the carcasses of animals; that there will be included such part of milk inspection as depends upon the recognition of disease in the cow supplying the milk or in the herd of which it is a part.

The report contains an excellent review of the history of the development of agriculture in the U.S.A., and the committee is investigating the veterinary extension service which is now established as part of the wider field of agricultural service.—H. V. HUGHES.

—. (1939). **[Report of Committee on] Education [American Veterinary Medical Association].**—*J. Amer. vet. med. Ass.* **95.** 573–578.

Approximately 2,770 students attended the veterinary colleges of the United States and

Canada in 1938. This was an increase of 196 over the previous year; 469 students graduated during the year. Enquiries addressed to the state authorities revealed the information that states were fairly well supplied with veterinarians.

Two colleges were visited by representatives of the association and the committee recommended that one of these be not approved for the purpose of state board examinations. The committee was informed that the veterinary colleges in the U.S.A. were compelled to limit enrolment because of lack of equipment and limitations of staff, but, in fact, only a few fully qualified applicants were refused admission.

Tables are given of the numbers of staffs in the various colleges, their ranks, qualifications, years of teaching, numbers of publications, and other activities.—H. V. HUGHES.

MCDONALD, E. (1940). **Progress of the Biochemical Research Foundation of the Franklin Institute.**—*J. Franklin Inst.* **230.** 727–748.

During the year under review, the Foundation, which is equipped with such instruments as the ultracentrifuge, cyclotron, and mass spectrometer, moved into a new building. Much of the work in progress is of fundamental biological importance, but the following are more likely to be of interest to readers of this bulletin:– a substance isolated from soil bacteria has been found to inhibit capsulation and so lead to the destruction of Gram-positive organisms including pneumococci, streptococci *Clostridium welchii*, and *Cl. tetani*, and has been utilized with success as a dressing for external infections; an extensive study has served to refute, so far as is possible with present methods, all bacterial theories of carcinogenesis; a fraction prepared from an alcohol precipitate of *Bacterium coli* has been found to be toxic to rats, and to cause diarrhoea and loss of weight when injected intravenously in sublethal doses; a water soluble fraction from human urine has been found to produce foetal resorption when injected intravenously into rats and mice.

—ALASTAIR N. WORDEN.

ALBANIA. (1938). Dhjet-vjeçori shërbimit veteriner e zooteknik 1928–1938. **[Collection of Papers in Honour of the 10th Anniversary of the Veterinary and Zootechnical Service of Albania, 1928–1938]**. pp. 135. Tirana: Shtëpija botonjëse "Kristo Luarasi". [8vo].

This is a history of the veterinary and zootechnical services of Albania since their foundation in 1928; in addition to the reports (which are provided with French summaries) of these two services, it contains details of the personnel of the departments, numerous excellent photographs of farming conditions and methods in Albania, and also an article on gastro-intestinal strongylosis by CARPANO.

The veterinary service was founded by Dr Seit BILAL; this report was compiled by the veterinary director, Dr Vasfi SAMIM. Out of a total animal population of 6,500,000 during 1928–38, there were reported 400,800 cases of infectious and parasitic diseases with a mortality of 76,184 (16%). The results of the campaign against disease are considered to be very satisfactory; in 1928 the mortality from sheep pox and pleuro-pneumonia of goats was 9,000 and 4,300 respectively, and by 1934 both diseases had ceased to appear. The most prevalent diseases in 1938 were strongylosis, mange, and liver fluke, with anthrax, pasteurellosis, blackleg, piroplasmosis, dourine, and contagious agalactia of considerably less importance. The government provided free preventive treatment against infectious diseases, and the service was growing rapidly, 120,000 head of cattle being vaccinated against anthrax in 1929, while for 1937 the figure was 660,000. In each prefecture was also provided a dispensary for the treatment of general diseases of domestic animals. The country was said to be entirely free from the following diseases:– caprine pleuro-pneumonia, sheep pox, swine erysipelas, bovine contagious abortion, foot and mouth disease, rinderpest, bovine contagious pleuro-pneumonia and salmonella infections.

The veterinary service was responsible for food inspection and the construction and modernization of abattoirs, and all animals and animal products exported from Albania were rigorously inspected; these included domestic animals, wool, cheese, eggs, etc.

In 1928 the Veterinary Bacteriological Institute was founded in Tirana to manufacture biological products and to act as a diagnosis centre, and in 1938 it was decided to build a new veterinary laboratory to be under the direction of Professor CARPANO.

The cost of the veterinary service was met out of a *per capita* tax of 0·50 gold francs for sheep and 3 gold francs for horses and cattle; the average expenditure each year was 189,260.80 gold francs.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1940). **Seventeenth Annual Report of the Grand Council, British Empire Cancer Campaign for year ended 31st July 1940.** pp. 280. London: British Empire Cancer Campaign. [4to].

This is a striking record of the valuable work on cancer research carried out under the auspices of the campaign during 1940 when, in spite of the war, all the more important investigations were continued. No further appeal for funds was made and the work was financed from the capital funds of the Campaign.

The following are some of the main lines of research :– the accelerating effect of Shope papilloma virus on carcinogenesis in tarred rabbits, purification of the filtrable agents of various tumours, the experimental production in mice of sarcomas by the injection of extracts of human liver tissue, the experimental production of liver tumours by certain azo-compounds, studies on the metabolism of tumour cells with especial reference to aerobic glycolysis, the role of humoral antibodies in resistance to virus-induced tumours in fowls, the part played by heredity in the incidence of cancer in man and in mice, the histological grading of human tumours, the mode of action of various types of radiation on tumours, and the effect of varying dosage of radiation.

References are given to the various publications, as well as a brief summary of most of them.—E. G. WHITE.

CANADA. (1937). **Report of the Ontario Veterinary College, 1937.** [MCGILVRAY, C. D.] pp. 32. Toronto: T. E. Bowman. [8vo].

The number of students enrolled for the year (243) was nearly twice that for which the college buildings were designed. A list is given of the teaching staff and there are notes on the courses of study, special investigations, extension services, and laboratory diagnostic services.

The report is mostly devoted to special articles on various diseases and case records which have already been abstracted in this bulletin.—J. E.

NEW ZEALAND. (1940): **Fourteenth Annual Report of the Department of Scientific and Industrial Research, 1939-1940.** Items of veterinary interest pp. 23, 29–30, 41–44 and 65. Wellington: Govt. Printer. [fcp] [2s.]

Details are given of the work assigned to the Grasslands Division by the Facial Eczema Management Committee. Herbage has been produced under controlled environmental conditions, including control of temperature, soil moisture, and humidity, and with particular reference to alternate wilting and flush periods of growth. Analyses of herbage produced under high soil temperatures, such as is observed in the field in seasons when " FACIAL ECZEMA " is prevalent, have indicated no marked differences in the carbohydrate or nitrogenous fractions studied.

Surveys have been continued on the cobalt content of soils and pastures in a number of districts in the South Island. No difference in the milk yield of dairy cows was observed following the use of cobalt licks in the Sherry Valley. At Westport, drenching trials with calves indicated that mineral deficiency was best dealt with by a combined copper-cobalt drench.—M. B. BUDDLE.

NEW ZEALAND. (1939). **Report of the Chemistry Section, Department of Agriculture, 1938-39.** [GRIMMETT, R. E. R.]—*Rep. Dep. Agric. N.Z. 1938–39.* pp. 67–71.

Analyses of pastures, animal organs, soils, limonites, limestones, and cobaltized superphosphates in connexion with cobalt deficiency has been continued. Pasture Co tends to a minimum in late spring and early summer and a maximum in winter or after prolonged drought. Experiments have shown the value of topdressing with cobaltized superphosphate in the prevention of " BUSH SICKNESS ". The average Co content of the livers of " bushsick " sheep is about 0·04 p.p.m. or less ; for healthy animals it is more than 0·10 p.p.m.

A considerable amount of work has been done in an effort to determine the chemical changes in pasture associated with FACIAL ECZEMA. This has involved fortnightly sampling of paddocks in use in animal experiments at Ruakura and also the examination of pastures from districts where outbreaks of facial eczema were in progress.

A report has been furnished to the Lands Department on the enquiry into the alleged poisoning of livestock by arsenic naturally occurring in soils and waters at Reporoa. [See also *V. B.* **10.** 381].

Experimental work on zinc poisoning is continuing at Wallaceville. A number of cases of suspected arsenic poisoning has been confirmed. Attention is drawn to the danger of arsenical weed-killers.

Two cases of suspected tutu poisoning were investigated and one case of yew poisoning. *Ranunculus rivularis*, or " waoriki ", suspected of being poisonous, was fed to a sheep at Ruakura. The animal died showing ulcerative gastro-enteritis.

Work has been continued on the mineral status of soils, particularly with regard to lime and phosphate.—LEWIS FITCH.

CYPRUS. (1940). **Annual Report of the Director of Agriculture for the Year 1939.** pp. 4. Nicosia: Cyprus Govt. Printing Office. [fcp] [3 piastres].

Abundance of pasture and forage crops followed a winter of good rainfall, and the condition of livestock was good. Apart from STOMATITIS of sheep no serious animal disease occurred. Helminth and insect PARASITES were still the most important causes of loss, and the veterinary service was engaged mainly in dealing with control measures against these parasites. The first year's dressings in a three-year warble-fly campaign [see *V. B.* **10.** 810.] were completed and gave satisfactory results. Owing to a vacancy in the post of veterinary officer, laboratory services were confined to routine work. Double vaccination of goats with goat and sheep strains of ANTHRAX vaccine gave better results than the use of goat vaccine alone, but protection was incomplete.—H. E. H.

MALAYA. (1940). **Report on the Veterinary Departments, Malaya, for the year 1939.** [WALLACE, W. R.] pp. 14. Kuala Lumpur: Federated Malay States Govt. Press. [8vo] [$1.00 or 2s. 4d.]

GENERAL.—This report, owing to war-time instructions, is given in an abridged form. The opening sections deal with the livestock survey, the general position regarding animal health, and animal husbandry. All classes of livestock, except swine (which decreased 8%) showed a significant increase in numbers over the previous year. There was no serious disease outbreak during the year, apart from some deaths in buffaloes in Brunei. The cause of these deaths was still under investigation.

The reader is referred to previous reports regarding the animal husbandry position which, in general, remained unchanged. Special attention was, however, being given to increasing the country's resources in goats, and to the possibility of rapidly increasing the numbers of poultry through the medium of local Chinese egg hatcheries.

ANIMAL DISEASES.—A single case of HAEMORRHAGIC SEPTICAEMIA was seen in a cow. Cases of UMBILICAL INFECTION in calves were seen and it is suggested that local zebu calves are more resistant to umbilical sepsis than the Friesian or other exotic breeds. TRYPANOSOMIASIS caused symptoms in a buffalo but ten out of 50 associated buffaloes had trypanosomes in the blood without showing symptoms. All 50 gave positive reactions to the mercuric chloride test. It is pointed out that there is probably a high incidence of infection with the non-pathogenic *T. theileri* and it is suggested that animals harbouring this parasite may react to the mercuric chloride test. The positive reactions to the test, apparently invariably given by buffaloes, may be due to this factor or possibly to some inherent peculiarity in the normal sera of these animals. Several cases of SARCOPTIC MANGE in cattle were recorded and the incidence of this condition in goats was fairly high. Preliminary trials with tetrachlorethylene gave satisfactory results in the treatment of PARASITIC GASTRITIS in cattle. A copper sulphate, sodium arsenite mixture was unsatisfactory. Cases of ARSENICAL POISONING occurred in cattle grazed on worked-out mining land sprayed with an arsenical weed-killer. Three cases of suspected TAPIOCA POISONING occurred in oxen. FOOT AND MOUTH DISEASE appeared in two outbreaks in Perak, but was of low virulence and infectivity. Several outbreaks of CONTAGIOUS ECTHYMA in goats were observed. A locally prepared virus-vaccine gave promising results in a field trial. Epizootic SWINE FEVER was not recorded in any part of Malaya though single cases were seen at abattoirs. Eight cases of CANINE RABIES were reported, but the disease was confined to the north-eastern corner of the peninsula adjoining Thailand. This was a very satisfactory position, especially with regard to the states of Kedah and Kelantan, where in past years the disease had seemed to be enzootic. DIROFILARIASIS in dogs was common in Perak. The disease, in young dogs, responded well to treatment with fouadin given at an early stage. Cases of PIROPLASMOSIS and TRYPANOSOMIASIS of dogs responded to treatment with acaprin

and naganol respectively. Widespread and destructive outbreaks of DIPHTHERITIC STOMATO-PHARYNGITIS of poultry were again experienced. Among other poultry diseases noted were FOWL POX and CONTAGIOUS CATARRH.

RESEARCH.—Susceptible animals were inoculated with blood from cattle which had previously received naganol treatment for *Trypanosoma evansi* infection and in which parasites could not be detected microscopically. No test animal could be shown to be infected and it was concluded that naganol was a fully effective trypanocidal agent. The virus of DIPHTHERITIC STOMATO-PHARYNGITIS of poultry was found to remain viable for 14–21 days under local conditions in unclosed wood cages not exposed to direct sunlight. A tissue vaccine prepared by passaging virus through fowls and alternating with periods of cold storage did not afford protection against virulent field strains. An attempt to infect local species of wild birds, with a view to determining whether they might be carriers, did not give conclusive results.

ANIMAL HUSBANDRY.—The Sindhi bulls imported from India during 1938 under the Livestock Improvement Scheme, Negri Sembilan, were stationed at convenient centres. The first progeny of these bulls had proved superior to locally bred calves. War-time balanced rations for polo ponies incorporating locally produced guinea grass hay and other local products were formulated.

Examinations of "surprise" milk samples from local dairymen in Negri Sembilan were carried out and a marked improvement in cleanliness was noted.

The report concludes with statistics regarding traffic in animals, slaughter stock, and survey of livestock.—H. E. HARBOUR.

JAMAICA. (1940). **Report of Senior Veterinary Officer, 1939-1940.** [LOCKETT, S.]—*Rep. Dep. Sci. Agric. Jamaica, 1939–40.* pp. 8–9.

SWINE FEVER was the only notifiable disease met with, several outbreaks occurring. GLANDERS, ANTHRAX, and FOOT AND MOUTH DISEASE were not reported. Other diseases dealt with were :– TETANUS, BOVINE TUBERCULOSIS, BOVINE CONTAGIOUS ABORTION, BLACKLEG, ULCERATIVE LYMPHANGITIS, NECROBACILLOSIS of goats, PIROPLASMOSIS and ANAPLASMOSIS of cattle, HAEMATURIA VESICALIS of cattle, PSOROPTIC MANGE, PARASITIC GASTRO-ENTERITIS of calves and goats, and LIVER FLUKE of cattle and sheep.

At the Government Stock Farm at Hope, abortions due to BRUCELLOSIS were comparatively few but serious trouble had been experienced with sterility in cattle. Nine cases of ACTINOMYCOSIS were seen. A single reactor to the tuberculin test was slaughtered but no gross lesions were found. At the Grove Place stud farm the general health of animals had been good, though there was a shortage of good grazing following drought. Preventive vaccination of cattle against ANTHRAX and BLACKLEG was successfully carried out. PSOROPTIC MANGE in equines was kept under control.

Lectures and demonstrations in veterinary science were given at the Jamaica School of Agriculture and sanitary inspectors were given instruction in meat inspection and hygiene.

—H. E. HARBOUR.

Extracts from Annual Reports of Agricultural Experiment Stations U.S.A. [The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published, abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of the titles of these reports will be found in *Index Veterinarius.*]

ALABAMA, 1938.—A note is given on current research on avitaminosis B_6 in rats.

ARIZONA, 1938–39.—There was failure in an attempt to isolate a pathogenic organism from the eyes of cattle and goats with KERATITIS. Poisoning by *Asclepias galioides*, *Aplopappus heterophyllus*, and plants producing prussic acid caused deaths in animals. *Aramanthus palmeri* apparently became toxic for cattle by the influence of frost. An area control scheme for ox-warble flies, by derris washes, was begun.

COLORADO, 1939–40.—(1) *Poisonous plants.* Dried stems of *Oxytenia acerosa* were toxic to a lamb. The HCN content of *Suckleya suckleyana* was studied. Blue-green algae (*Anabaena flos-aquae*) was found toxic for rabbits, g. pigs and chickens. Nitrate in oat hay is changed to nitrite in the rumen, and is toxic. Water extracts of nitrate-containing beet tops were toxic to a lamb. (2) *Cattle diseases.* A study was begun on the effects of fasting on MASTITIS. BRUCELLOSIS was eradicated from the station herd by the disposal of reactors. A new disease characterized by haemorrhage in the thalamus

of the brain was investigated. Notes on HELMINTHIASIS are given. (3) *Sheep Diseases.* Vaccination arrested the spread of SOREMOUTH in a large flock. From lambs dying from COCCIDIOSIS five species of *Eimeria* were identified, *viz*, *arloingi*, *parva*, *nina-kohl-yakimovi*, *faurei*, and *intricata*. Data on *Moniezia* infestation are also given. (4) *Poultry diseases.* PULLORUM DISEASE and PARATYPHOID caused many outbreaks in turkeys. Experimental data on GOITRE in fowls show that iodine is deficient in the water and plants of Colorado. Soya bean oil contains a goitrogenic factor. (5) *Dog diseases.* Sulphanilamide was effective in ridding six out of seven dogs of *Isospora bigemina*.

GEORGIA, 1939–40.—Advice is given for destroying ticks and lice on sheep, and for controlling worms of sheep.

KENTUCKY, 1938.—An attempt to transmit PERIODIC OPHTHALMIA by filtered and unfiltered eye fluid failed, though when injected into the eyes inflammation developed. Research on incoordination in young horses (" WOBBLERS ") by bacteriological and biochemical methods failed to throw light on the cause. Western type EQUINE ENCEPHALOMYELITIS was diagnosed from the head of a brood mare sent for examination. Two new types of *Salmonella* were discovered in fowls—*S. minnesota* (XXI : b —e, n, x) and *S. worthington* (I, XIII, XXIII : l, w—z . . .). A host-list of *Salmonella* species infecting domestic animals is given. Six species of lice infesting poultry are named and nicotine in water or oil is advised for control. Bluegrass region water has a low and harmless fluorine content. F is evidently not involved in the causation of " wobblers ". The Public Service Laboratory diagnosed RABIES from 123 out of 237 " brains ".

KENTUCKY, 1939.—Further attempts to transmit PERIODIC OPHTHALMIA failed. Its histopathology is described and notes on its incidence in and around Kentucky are given. BRUCELLA INFECTION appeared to have no significance. The number of cases of " WOBBLERS " was less than in 1938. Damage to, and localized loss of, tissue in the spinal cord and nerves of affected horses were noticed. Intranuclear inclusions were found in the liver of five aborted equine foetuses from cases of " VIRUS ABORTION ". Four new species of *Salmonella* were isolated from fowls, *viz*, *S. california* (IV, XII : g, m, t), *S. meleagridis* (III, X : e, h : l, w), *S. litchfield* (VI, VIII : l, v : 1, 2, 3), and *S. saint paul* (I, IV, V : e, h : 1, 2, 3), and four in animals, *viz*, *S. wichita*, *S. eastbourne*, *S. give*, and *S. san diego* [antigenic formulae not given]. A study was made of 391 cultures of *S. typhi-murium* and of 70 cultures of *S. cholerae-suis*, all from animals. *Corynebacterium renalis* was isolated from cases of PYELONEPHRITIS in a cow and a sheep, *C. pyogenes* from the brain of two sheep, and *C. equi* from two foals. SWINE ERYSIPELAS and LISTERELLOSIS in sheep were diagnosed in Kentucky for the first time. The Public Service Laboratory diagnosed RABIES in 145 out of 227 brains, 117 being dogs and the rest farm animals.

MASSACHUSETTS, 1939.—*Poultry Disease Control Service.* The progress of the PULLORUM DISEASE eradication scheme, routine diagnosis and research on avian types of pasteurella, avian encephalomyelitis and neoplastic diseases in fowls is described. EQUINE ENCEPHALOMYELITIS virus was isolated from a pheasant. *S. pullorum* was found to have survived for seven years on dry cloth. The course of PULLORUM DISEASE in turkeys is under observation. Studies on strains of fowls with the object of producing strains with high and low mortality characteristics were in train. An attempt to increase the iron content of milk by feeding iron ammonium citrate to cows failed.

NEBRASKA, 1939.—56,000 doses of culture vaccine against SWINE ERYSIPELAS were issued and antiserum potency tests were carried out. Immunity studies on SWINE FEVER and studies on poultry disease incidence were begun.

NEW HAMPSHIRE, 1939.—The control of MASTITIS by segregation was found to be practicable. Studies were made of staphylococci from bovine udders ; they were classified into three groups on a basis of behaviour in the coagulase test and in blood agar and blood broth. All strains produced some β toxin $\pm$ α toxin. Details are given on the progress of PULLORUM DISEASE eradication, results of autopsies on fowls, control of avian COCCIDIOSIS, on a FOWL PARALYSIS experiment, ULCERATED GIZZARD in chicks and on the technique of dosing sheep.

RHODE ISLAND, 1939.—Attempts to destroy growth factors for *Haemophilus gallinarum* by injecting various chemicals into fowls gave negative results. Immunity was not conferred against INFECTIOUS CORYZA by intradermal injections of the organism. A Rhode Island

strain of INFECTIOUS BRONCHITIS virus increased in virulence during 84 egg transfers. The virus differs in some respects from a New Jersey strain. A summary of results of autopsies on fowls is given.

TEXAS, 1939.—Two BRUCELLOSIS-free herds have been formed, one from isolated young stock and the other by testing and removal of reactors. Over half a million doses of SORE-MOUTH vaccine were issued. Immunity against *Haemonchus contortus* was produced in three lambs fed doses of larvae. Hard yellow livers in sheep were found due to ingestion of *Senecio longilobus*. Toxicity tests with many Texan plants are reported. Lambs were immunized against ENTEROTOXAEMIA by vaccinating ewes with zinc chloride toxoid of *Clostridium welchii*, Type D. A peculiar nervous malady ("LIMBERLEG") of sheep was under investigation. No immunity against SCREW-WORM [*Cochliomyia americana*] was induced in sheep by intradermal injections of larval extract. Short-nosed ox lice (*Haematopinus eurysternus*) were successfully destroyed on 7,000 cattle by dipping in a sulphur-cube (5% rotenone) dip. Research was done on wetting agents for sulphur dips. Prolonged feeding of sulphur did not rid sheep and goats of lice. Sulphur in rations for chicks retarded the development of the small intestine and caeca. CRYPTORCHIDISM has been bred out from the station goat herd. Various dietary deficiency studies are described.

WYOMING, 1939–40.—A PULLORUM DISEASE control campaign was started. Abortion in two large ewe flocks was found to be due to a *Spirillum*. Investigations were being undertaken on the relation between PARASITES of domestic and game animals, FOWL PARALYSIS, POISONING by ground lichen, and nitrate poisoning from oat hay.—J. E.

BOOK REVIEWS

HULL, T. G. [Ph.D., Director, the Scientific Exhibit American Medical Association]. (1941). **Diseases Transmitted from Animals to Man.** pp. xiii + 403. Numerous figs. Springfield, Ill. : Charles C. Thomas. [2nd Edit.] [8vo].

This new edition adheres closely to the plan of the first edition of 1930, which was written entirely by the author. Now he has enlisted the aid of 14 medical and veterinary workers to rewrite some of the chapters on subjects on which they are authorities, *e.g.* HUDDLESON writes on brucellosis. The present edition has new chapters on louping ill, sore mouth of sheep (ecthyma), equine encephalomyelitis, and Rift Valley fever which occur in farm animals, and on typhus fever and relapsing fever, which, while not affecting farm animals, have animal (rodent) reservoirs.

Great success has been achieved in condensing the maximum amount of information into the book which still is a useful size. The material is mostly from American literature and records, and European readers will probably be puzzled on seeing "milk sickness" in the contents list. This disease is limited to parts of the U.S.A. where the white snakeroot and rayless goldenrod plants grow, "milk sickness" being poisoning by their toxic principle, tremetol.

The last section of the book which deals with the role of each animal in the spread of disease, is good but would have been better for rapid reference purposes if the diseases had been listed in a table, as well as being referred to in the text.

This is the leading book on its subject and is thoroughly recommended. The paper, cover, and printing are all excellent and there is a good index and a select list of references at the end of each chapter.—J. E.

WARREN, C. [B.A., B.S., M.S.J.] Edited by DURFEE, T. [Director of the Applied Research Laboratories, Inc. Dayton, N.J.] (1940). **Animal Sex Control. A Practical Guide for Breeders.** pp. 174. Numerous figs., plates. New York : Orange Judd Publishing Company, Inc. [1st Edit.] [8vo] [$1.75].

In ancient and modern folklore, in the classics, and in contemporary scientific literature, claims have been made for the ability to control sex by artificial means. All such claims without exception have remained unsubstantiated when submitted to accurate scientific analysis. In this book the author has gathered together data which appear to show that sex in man and other mammals can be controlled by the selective sperm action of sodium bicarbonate and lactic acid. The method

consists in douching the vagina a short time before service with a 1–2% solution of lactic acid if a preponderance of female offspring is desired, or with a 1–2% solution of sodium bicarbonate if male progeny is wanted.

The data and the claims made by the author for the method induce scepticism, and it is felt that an extensive series of controlled experiments over a period of years would be necessary before the method could be regarded as a proven contribution to the science of animal breeding.—N. J. SCORGIE.

ADRIANI, J. [M.D., Instructor in Anaesthesia, New York University College of Medicine, Assistant Visiting Anesthetist, Bellevue Hospital]. (1941). **The Pharmacology of Anesthetic Drugs. A Syllabus for Students and Clinicians.** pp. ix+86. Numerous figs. Springfield, Ill.: Charles C. Thomas. [2nd Edit.] [4to].

The fundamental properties of general, local, and spinal anaesthetics are presented in an arresting manner, the generous use of illustrations facilitates reference. Substances which may be used in conjunction with anaesthetics, *e.g.* opium alkaloids, atropine, and analeptics, are also dealt with in the same manner. The book contains much data, though no attempt is made to discuss controversial matter, and there may indeed, be disagreement with some of the statements made, *e.g.* that cyclopropane produces little effect on the blood pressure unless there is respiratory depression. Nevertheless, the book is likely to prove of great value for easy reference, and it contains quite a good bibliography and useful glossaries. The printing and production are admirable.

—J. M. ROBSON.

WADDINGTON, C. H. [Fellow of Christ's College, Cambridge]. (1940). **Organisers and Genes.** pp. x + 160. 15 text-figs., 2 plates. Cambridge: University Press [8vo] [12s. 6d.]

Embryology as met with in veterinary and medical curricula is of necessity mainly confined to the description of developmental processes occurring in the embryo, little attention being given to the reason why the development from zygote to fully formed foetus should proceed in an orderly and regulated manner. This fundamental aspect has, however, received considerable attention from experimental embryologists, and by the brilliant work of SPEMANN, HOLTFRETER, WADDINGTON and others, considerable advances have been made towards the elucidation of this intricate problem. The concept of organizers and organization centres in the embryo was the outcome of a micro-surgical technique invented by SPEMANN, whereby pieces of tissues in the early embryo could be isolated and transplanted to regions other than those in which they normally develop. Employing this technique, SPEMANN and his co-workers were able to demonstrate that there exists in the early embryo a centre with respect to which all the rest is organized. This primary organization centre and other secondary centres which develop later have now been established as determining the future development and form of the embryo. These organization centres, or organizers, are thus ultimately responsible for inducing the developmental processes within the embryo in a logical and determinate sequence. This book is for the most part devoted to a discussion of the phenomena of organizer action. Much of the subject matter is concerned with the analysis of hypotheses, and in the absence of factual data it is " difficult reading " for the uninformed reader. Considerable space is devoted to " pointing out the similarities between the concepts derived from the consideration of the organiser and those which arise in connection with the developmental effects of genes ".

The chapters dealing with gene action and reaction, especially in relation to the hormonal control of normal and abnormal development, should prove of interest to those engaged in certain fields of veterinary research. In the chapter dealing with " Organisers and Growth", the author discusses certain aspects of the origin of differences in growth rate which are relevant to the study of carcinogenesis.

This book is obviously written for the trained experimental embryologist and specialist geneticist, but readers of this bulletin who are interested in the causal analysis of development will find much stimulating discussion within its pages.

[Readers who desire a popular exposition of experimental embryology and organizer action should consult " How Animals Develop " by the same author. (1935). London: George Allen & Unwin, Ltd.]—N. J. SCORGIE.

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INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

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